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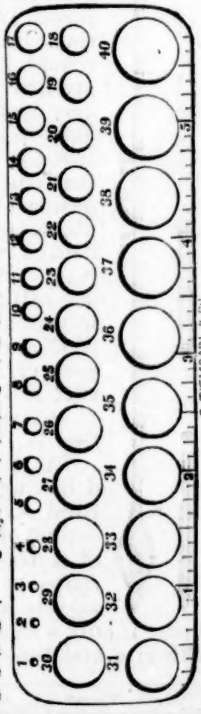
ORIGINAL COMMUNICATIONS.

ART I.—A Description of the Instruments and Apparatus of the Author, with directions for their use in operations on the Genito-Urinary Organs. By F. N. OTIS, M. D., Clinical Professor of Genito-Urinary Diseases in the College of Physicians and Surgeons, New York.

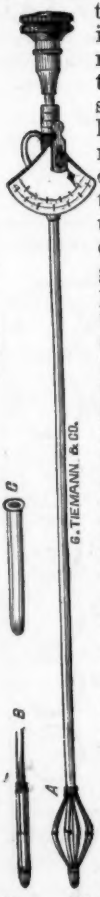
The Urethral Scale.—This is graduated by the French millimetre from 1 m. in circumference to 40. On the opposite side are the numbers of the English scale. "The scale for grading the sizes of instruments has never been very accurately fixed, except in France."* The French scale (*Charrierefiliére*) increases by one millimetre in circumference. This is a recognized standard scale in all countries, at the present day, and the sizes of all other scales must be translated into this, in order to become intelligible in descriptions of cases. It is not rare to find urethræ with normal calibre of 40. The entire set, from 8 m. to 40, is absolutely essential to every surgeon who desires to make complete and accurate urethral measurements. The stricture which will permit say 25 of this scale to pass without obstruction, will often hold distinctly and firmly upon a bulb measuring 26f. It is thus shown that the gradation of this scale is not too fine, and that no numbers can be dispensed with.



The Urethra-meter.—With this instrument an accurate measurement of the normal urethral calibre may be made, in any case, within the compass of the instrument, the bulb of which can be

*Genito-urinary diseases, Drs. Van Buren and Keyes, New York, 1875, p. 111.

made to expand from 20f to 45f.† The dial, near the handle, indicates, in millimetres, the exact amount of expansion of the bulb. Introducing it closed (and covered with the rubber cap, which serves to protect both the instrument and the uretha) down to the bulbo-membranous junction, by means of the screw at the handle, the bulb expands up to the point of the sensation of fullness felt by the patient. The hand on the dial will then point to the figure representing the normal calibre of the canal under examination. Strictures in the regions anterior to the bulb may also be accurately defined and measured by this instrument. When the bulb is suddenly arrested in withdrawal, the screw should be gradually turned until the bulb is permitted to pass. The position of the hand on the dial will then indicate the calibre of the stricture. It should, however, be borne in mind that, when the urethra is very sensitive, spasmodic contraction may simulate an organic stricture. It is, therefore, necessary to verify the results of this examination with the bulbous sound before deciding that true stricture exists. If the latter instrument defines a contraction at the same point, by measurement, and, when passed beyond it, is distinctly held on return, the proof of organic stricture is complete. When the urethral contractions are below the calibre of the closed bulb, or when they are numerous and close together, the normal calibre of the canal may be assumed from the circumference of the flaccid penis. When the circumference is 3 inches the urethra has a normal calibre of at least 30f; if $3\frac{1}{4}$ it will be 32f; if $3\frac{1}{2}$=34f; if $3\frac{3}{4}$=36; if 4 inches=38; if $4\frac{1}{2}$ inches=40, or more.



The Bulbous Sound.—This is intended solely for detecting the size, length, and locality of the urethral strictures. After ascertaining the normal calibre of the presenting urethra, a bulbous sound of corresponding size should be well oiled and presented at the meatus. If it passes in readily, this may be accepted as representing the normal calibre. If only a smaller size will enter, the difference between this size and that indicating the normal calibre will show

†Messrs. Tieman & Co have succeeded in making the Urethra-meter of a calibre of 12f, a fine instrument. Both Tieman and Otto & Sons make it of 18f, which is perhaps as small as is consistent with durability.

the exact amount of contraction present at this point. This contraction should be divided so thoroughly that the full-sized bulb can enter without the least sense of obstruction. The bulb should then be advanced along the canal. If deeper obstruction is met, a smaller-sized bulb should be selected, and when one is found which just passes the contracted point, slightly stretching it, on attempting the withdrawal of this bulb it will be firmly held by the posterior border of the stricture. The distance between the point of arrest of the large bulb and the point of holding of the smaller, carefully measured, will give you the position and length of the stricture, and the size of the smaller bulb will indicate its calibre. The same method of procedure will apply to the diagnosis of any remaining contractions of the deeper portions of the canal. In the curved portion the shaft of the bulb should be bent to correspond with the sub-pubic curve.

The Bulb-Pointed Bistoury, or Meatotome, is intended for

division of contractions at or within an inch of the meatus. This, well oiled, should be advanced into the meatus, while the end of the penis is supported by the fore-finger of the opposite hand, and carried along, with the bulb point bearing against the superior wall of the canal, until well behind the posterior border of the contraction. It should then be depressed, and the cutting edge drawn firmly and slowly down, cutting deeply in withdrawal, and carefully preserving the vertical direction of the natural orifice. The tissues in this locality are usually dense and resilient, and the firm support of the finger under the glans is required to effect a proper division, which should never be expected, or attempted, in a single cut. An incision having been made, its extent should be ascertained by the larger bulb, and if, as is more than probable, it fails to pass, or if, in passing, it is caught on return, the same proceeding should be repeated until the free passage of the full-sized bulb in entrance and withdrawal is secured.

The hæmorrhage following may be slight, ceasing after a few moments' pressure, or it may be profuse, requiring some mechanical appliance for its arrest. A short

Urethral Tube of silver or gutta-percha two m. below the normal calibre may be introduced and fastened by

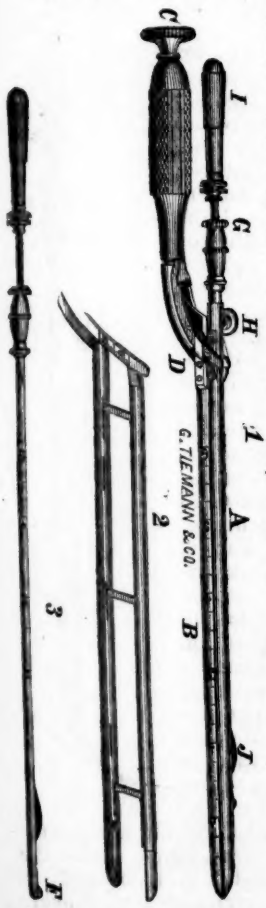
means of a narrow bandage, the pressure of which, bearing upon the tube, will effect the desired result. The danger of free hæmorrhage is not past until healing of the cut surfaces is well advanced, and should be provided for in all cases for at least forty-eight hours.

The *Spring Tampon* may be conveniently used for the same purpose. It consists of steel or German silver wire, bent so as to form a spring with parallel arms, the upper of which is provided with a fenestrated end, which helps to hold the instrument in place, while upon the lower a little styptic cotton or lint is wound. The arms are approximated by a thumb-screw, until they readily enter the canal, to a point just behind the incision, when, by loosening the screw, the pressure just sufficient to arrest the hæmorrhage may be readily made. The full-sized bulb should be passed daily, or at least every other day, until healing is complete. Should the least recontraction occur, it is an evidence that some fibrous bands have escaped division, and the operation must be repeated, if a perfect result is desired. The after treatment of a urethrotomy consists in keeping the divided tissues from reuniting, and this is most effectually done by the daily passage of a conical steel sound. For dividing deeper strictures, the simplest, and which answers a good purpose in dense narrow strictures, is the

Bulbous Urethrotome.—This in shape is like the bulbous sound, so constructed that, after passage through a stricture, a broad blade concealed in the bulb is drawn forward through the contracted point, by means of a handle which traverses the hollow shaft of the instrument. The blade is pushed back through the stricture into its place of concealment, and the instrument withdrawn; and if the bulb has been of sufficient size to make firm resistance, on attempted withdrawal *before*, and meets with none *after* incision, it is probable that the test by a bulbous sound of the size of the normal canal will show that the division has been complete. The bulbs of this urethrotome are readily changed, and range in size from 20f to 40f.

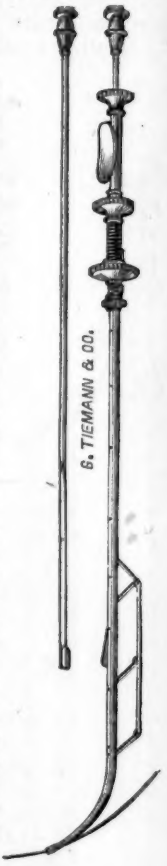
In order, however, with certainty to divide completely any stricture, by the internal method, the principle of dilatation (which, to a certain limited extent, obtains in the bulbous urethrotome) must be prominently combined with the incision, and this is best seen in the

Dilating Urethrotomes, of which there are four. No. 1 consists of a couple of parallel bars, which are separated at will by means of a screw at the handle. The upper bar carries a canula, in which a narrow blade is concealed, and is made salient by being drawn forward, or pushed backward over a short elevation on the floor of the canula. The canula, being movable, enables the operator to elevate the knife at any point along the upper bar without moving the instrument. The bars when closed represent a size of 23f; when fully separated, 40f. The instrument is introduced closed; the bars are then separated by means of the screw at the handle, until the full size of the normal urethral calibre is reached. The blade, which has been previously adjusted to emerge at the point of stricture, is then drawn forward, and the stricture thoroughly divided. By loosening the screw which fixes the position of the canula in the bar, the knife may be raised and the canula drawn forward, thus cutting any desired distance. The amount of dilatation is registered on a scale near the handle. This is a strong, efficient instrument, but can not well be made of a less calibre than 23f.



Dilating Urethrotome No. 2 is designed for a wider range of strictures. This, when properly made, may be closed to 20f and dilated to 45f. It has the further advantage of distending only a limited portion of the canal contiguous to the locality of the stricture;

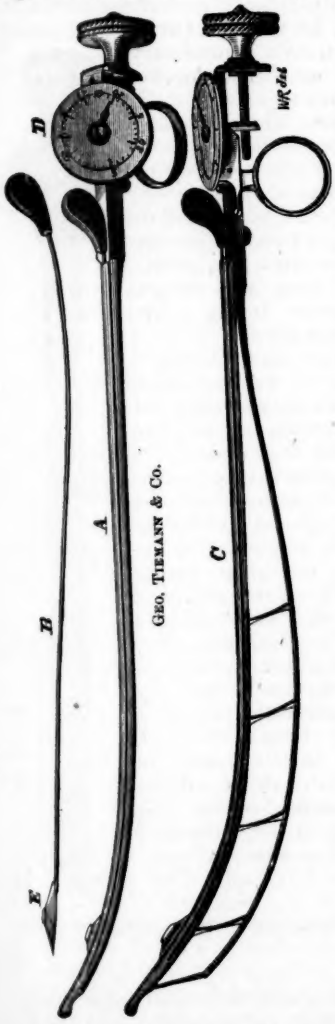
but the incision can only be made of one length, corresponding to the length of the bridge over which the blade runs. This, as usually arranged, is about one inch. The blades in this, and in the previously described, should be capable of projection, not less than one nor more than two millimetres. The amount of dilatation is indicated on a dial plate near the handle.



Dilating Urethrotome No. 3 should measure 18f when closed, and be capable of expansion to 45. It is curved so as to pass readily through the curved portion of the urethra when this is necessary. It is thus well adapted for the division of deep strictures. The cutting apparatus of this instrument differs entirely from Urethrotomes Nos. 1 and 2. In No. 3 the blade is guarded at the top like that of M. Maisonneuve, for the purpose of avoiding incision of the healthy portions of the canal in introduction; in the same way it limits the incision or withdrawal. This instrument is introduced closed, and without the knife, unless the stricture is very large. The knife is then carried down, the screw at the handle turned until the hand on the dial indicates two or three millimetres beyond the previously-determined normal calibre of the canal, and the blade is then drawn through the stricture or strictures. The instrument is then closed to 25f and withdrawn. Partial closure prevents pinching of mucous membrane. The results are ascertained by examination with the full-sized bulbous sound. If a *trace* of stricture is left, the operation should at once be repeated, either using a wider blade or dilating two or three more millimetres. In very resilient strictures two or more attempts are sometimes unavoidable before complete sundering of the strictures is effected—nothing short of which can produce *permanent* beneficial results.

The guarded blades of this instrument should not project more than four millimetres, nor less than three, above the shaft; and the guard should not exceed ¼ m. in breadth, as more than this will hold behind the stricture and prevent easy division. In case of very dense and resilient stricture,

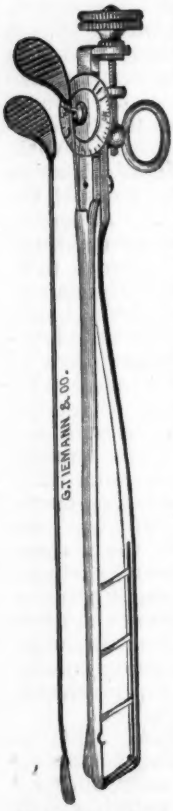
a perfectly plain blade may be used, always in such event turning the instrument down as soon as the blade has passed through the stricture.



Dilating Urethrotome No. 4 is like No. 3, except that it is smaller, quite straight, and can be used in division of strictures down to the bulbo-membranous junction, without the necessity of dilatation of the deeper portions of the canal; hence, for all operations in the ante-membranous region, it is much to be preferred to the longer-curved instrument. In skilled hands it may also be used to advantage in the deeper parts of the canal. It is made with less difficulty, is of smaller diameter (16f), and more easily managed in the straight portion of the urethra. The hæmorrhage following operation with the dilating urethrotome, after the manner described, is usually slight, and ceases on slight pressure with the fingers at the point of incision—often without it. In some cases oozing continues, and may require the introduction of the

Endoscopic Tube.—This is six inches in length and of a calibre 28f m. to 32, and provided with an entering shaft to facilitate introduction.—The tube is introduced to a point beyond the incisions, and pressure made by a narrow retaining bandage sufficient to control the hæmorrhage. The shaft is withdrawn when the patient desires to urinate, which he readily

does through the tube, thus preventing contact of urine with the freshly-cut surfaces. Even if no hæmorrhage occur, it is well to introduce this tube, for the first twenty-four hours, whenever urination is necessary. The tube, for easy introduction, should be about two sizes (millimetres) below the estimated normal calibre of the canal.



By means of the endoscopic tube, ocular examinations may be easily made at any point in the straight portion of the urethra. For controlling hæmorrhage at or near the meatus urinarius, shorter tubes, called meatoscopes, are used.

Solid Conical Steel Sound. — The form most convenient is that figured on next page, the curve of which corresponds to an arc connecting the ends of a right angle measuring 1½ inches. At the commencement of the curve, the size gradually diminishes, until, at the rounded extremity, it is one-fifth smaller than the shaft. For facility of introduction, and easy adaptation to the sub-pubic curve, simplicity of manufacture, and convenience in practice, it has my preference to all other varieties. The sizes run from 28† to 40, corresponding to the range of normal urethral calibre. Thus far, the extreme No. 40† has been met, once in fifty cases of adults; the opposite extreme, No. 28†, only once in three hundred. The average is about 32.

For preventing pain, irritation, and inflammatory action after operation, the

Cold Water Coil is valuable.

This apparatus is formed of a line of the small-sized India-rubber tubing of one sixteenth of an inch calibre, and six or seven yards in length. At the middle portion this tubing

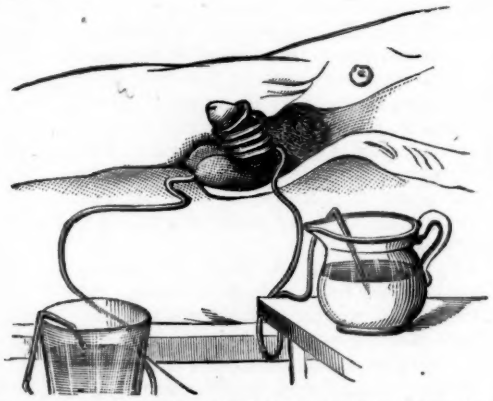
is coiled upon itself, so that, by half a dozen turns or more, it presents sufficient capacity to loosely encircle the entire penis.

This coil, with the length of tubing proceeding from it, forms an apparatus through which, on placing one extremity of the tubing in a bowl or tumbler of ice-water, exhausting its contained air (by suction, or by drawing the tube through the finger), a siphonic current is established through the coil. The discharge-pipe being placed on a lower plane than the water-supply, the current may be kept up until the vessel is emptied.

The rapidity of the flow can be regulated, either by raising or lowering the end of either tube, which is the simpler plan; but the more convenient one is by a tapering, double, silver tube, attached to the discharge-pipe, a sponge being fitted to the inner tube. This sponge, when the inner tube is pushed down into the smaller end of the outer tube, becomes compressed and gradually obstructs the flow of water until not a drop will exude. This contrivance may be regulated so that either a free stream can pass, or that the single drops shall follow each other, more or less rapidly, with the regularity and precision of a time-piece.

By means of this arrangement, I have been able to apply cold to the penis, or scrotum, continuously, and conveniently both to the patient and the surgeon. The coils of tubing are retained in position by a band of cotton or linen cloth. A ready method of constructing this apparatus is by placing a strip of thin cloth, six inches in length and two in breadth, lengthwise, upon a large speculum or a four or six-ounce vial. The tubing, taken at the middle of a piece six or seven yards long, is wound around the vial, and, after the requisite number of turns are made, the projecting ends of the cloth are doubled over the coils and stitched to the underlayer, between the turns of tubing. If, after completion, the turns are found too small, they may be readily enlarged by drawing the tubing through the cloth to any desired extent.

I have found this simple contrivance of essential service in the acute form of gonorrhœa, reducing inflammatory action promptly, and thus giving relief to painful micturition and erections.



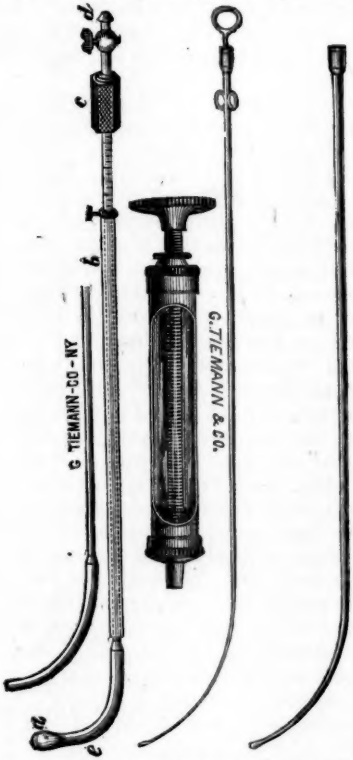
It has proved of great value in keeping down inflammation, and in preventing erections after the operation of circumcision. I habitually use it for the same purpose in operations for stricture, and with results more prompt and satisfactory than those hitherto attained by any medication or application with which I am familiar.

In examinations of the bladder for stone, where stricture is present, it is often difficult, on account of the contraction and the more or less spasm usually associated with it, to get sufficient play through the urethra to make an efficient examination of the bladder. Besides, in irritable subjects, when no stricture is present, spasm of the *compressiores urethræ* not unfrequently holds the exploring instrument so as to impede, if it it does not quite prevent, the examination. For the purpose of avoiding this embarassment the

Canulated Exploring Sound may be used. It is simply an ordinary sound upon which a metallic or hard rubber canula, seven and a half inches in length, is made, so as to be movable on the shaft of the sound. When slid down against the shoulder at the commencement of the curve, and fastened by the screw at the proximal end of the canula, it may be used in the ordinary way; but when it is held by stricture or spasm, the screw is loosened, allowing the play of the sound *through* the tube.

The Dilating Catheter is used in the preparatory dilatation

of strictures too small to admit the necessary instruments for immediate operation. I have designed the accompanying modification of Sir Henry Thompson's* probe-pointed cathe-



ter. It consisls simply of a fine probe-pointed silver tube, eleven inches in length and three millimetres in circumference at its point, gradually increasing in size, so that at six inches it is six millimetres. This tube is traversed by a steel stylet throughout its length. Carefully insinuated through a close stricture, by the aid of a finger in the rectum, until its point may be supposed to have reached the bladder, the stylet is removed, and a small syringe is applied to its proximal opening. If the instrument has passed the *sphinc-*

*Thompson on Stricture of the Urethra. London Ed., 1858, p. 181.

ter vesicæ, on a withdrawal of the piston the urine will appear in the barrel of the syringe. The instrument may then be confidently pressed onward until the stricture is dilated to the largest capacity of the tube. A second tube of corresponding form, but with dimensions ranging from four millimetres at the point to eight millimetres, may then be similarly used.

In cases where, on account of the extreme closeness of the stricture, or from its divergent or tortuous course, a difficulty in passing the instrument occurs, Dr. Gouley's whalebone *guide-bougies* will prove serviceable.* These are used as in his grooved, canulated staff, viz., by the previous introduction of the guide-bougie into the bladder, *threading the dilating catheter upon it and following it down through the stricture.* Succeeding in this maneuver, the guide-bougie may be removed, the presence of the dilating catheter in the bladder tested by aid of the syringe, the stylet introduced, and the stricture dilated as previously described. The whalebone guide-bougies, to be used in this manner, require to be from sixteen to eighteen inches in length. They are easily made of *any* desired length and fineness, and, by steaming or rapid passage through the flame of an alcohol lamp, may be moulded at the extremity to any curve or angle deemed most likely to adapt itself to the eccentricity of the stricture.

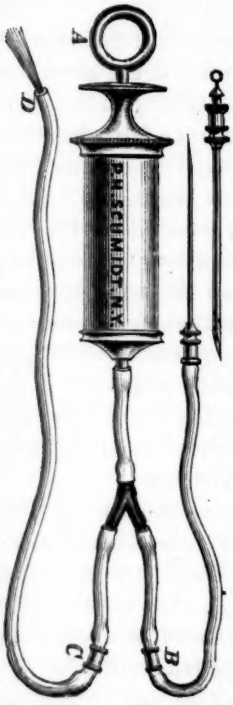
In comparison with all other instruments for the same purpose, the relatively smaller calibre of the dilating catheter must give it an important advantage in cases of stricture of extreme tenuity. Through its successful use, the earliest possible assurance of entrance into the bladder may be acquired. It is of simple construction, of flexible material, and of uniform strength. It will, I feel confident, enable the judicious and experienced surgeon to accomplish a satisfactory dilatation of many strictures, which, without its aid, would necessitate a puncture of the bladder or the perineal section.

Otis's Simplified Aspirator.—The accompanying engraving represents a simple instrument, the original of which was extemporized from materials within the easy reach of every surgeon, and so combined as to form an *aspirator*, complete and efficient for all ordinary purposes.

The "simplified aspirator" consists of an ordinary well-fitted syringe (A), of any convenient size, joined to which, by an inch of rubber tubing, is a short, hard rubber metal, or glass bifurcating tube. To each arm of this tube is attached another bit of rubber tubing, which terminates in a

*Gouley on Diseases of the Urinary Organs. New York, 1873, p. 51.

hard rubber valve, such as is used in the construction of the Davidson syringe. These valves are arranged to work in reverse directions. On retraction of the piston of the syringe, the valve at B (connected by tubing with the aspirating needle) opens and permits access through the needle to the barrel of the syringe. The piston being driven back the valve at B closes, while that at C opens and empties the syringe through the connecting discharge-pipe. Near the base of the needle a short glass tube is inserted in order to afford early information of the character of the fluid in process of evacuation. "The simplified aspirator" was the result of a necessity for an instrument sufficiently small to fit in my "retention case," and a one-ounce hard-rubber syringe was found to be sufficiently large for easy aspiration of the bladder. In an emergency it might be used for transfusion, simply by adapting a small canula to the discharge pipe. This instrument has been duplicated by Mr. Schmidt, the surgical instrument maker, corner Thirty-fourth street and Broadway, and is put up in a case, with two sizes of aspiration needles, for nearly one-third the price of an ordinary aspirator of the cheapest description.



108 WEST THIRTY-FOURTH STREET, NEW YORK, June 17, 1875.

ART. II.—*On Angina Pectoris.* By Dr. JOHN C. PETERS, M.D., President of the Medical Society of the County of New York, and of the New York Neurological Society.

Angina pectoris is either a neuralgic or muscular affection of the heart, which may occur with or without organic disease of that organ. Thus in Trousseau's cases five were organic and eleven non-organic. But still it is especially liable to occur in connection with obstruction of the coronary arteries,

and with fatty degeneration of the muscular tissue of the heart.

Quain has laid much stress upon affections of the coronary arteries, accompanied by fatty degeneration of the heart, and the two diseases are often coincident. Rigidity and constriction of the coronary arteries, dependent upon fatty degeneration or atheroma of their coats, often seriously diminish the supply of blood going to the walls of the heart, and leads to fatty degeneration of them; and it is often found that the most extensively diseased branch of the artery supplies that part of the heart which has undergone the most complete fatty change. Thus, as the condition of the coronary arteries is often fatty, it may be due to the same cause which produces the degeneration of the muscular substance of the heart. Those who always look for calcification of the coronary vessels will often be disappointed, while almost complete soft fatty obstruction is often overlooked.

The characteristic symptoms of angina pectoris are those of very great derangement of the action of the muscles of the heart, either from paralysis or spasm, and they are also apt to occur when there is an insufficiency of the aortic valves, attended with a rigid and dilated state of the ascending aorta, combined with dilatation of the left ventricle. Attacks of angina pectoris are most apt to occur when the action of such a diseased heart and aorta is suddenly disturbed by physical exertion, especially when walking against a strong cold wind, or going up hill, or stairs, or from fits of anger or excessive mental emotion. which suddenly embarrass the action of the heart. The patient is then quickly seized with an intense, agonizing pain in the præcordial region, as I have often experienced, shooting through to the back and along the left arm, and producing a sense of sudden oppression or impending suffocation, although he may be able to take a long breath if required to. The face first becomes deadly pale, and is expressive of extreme anxi-

ety and suffering; cold perspiration breaks out; the pulse falters and may become almost imperceptible; the respiration is short and hurried; the face turns livid, and the patient is unable to lie down, or even move, as the least motion aggravates his sufferings intensely. Not unfrequently, however, the heart's rythm is undisturbed, and the patient experiences no palpitation or oppression, but sometimes the heart stops suddenly, and death ensues. These symptoms have been variously interpreted. Sometimes it has been supposed that the circulation in the coronory arteries is temporarily stopped, the walls of the heart become bloodless, and a true epilepsy of the heart is caused. More frequently, perhaps, there is over-accumulation of blood in the heart, from weakness or partial paralysis of its fatty degenerated walls, or sudden free aortic regurgitation may arrest the heart's action by paralysis from over-distension. This quick overloading of the cavities of the heart with blood will account for some of the severe pain, the indescribable anguish, and the sense of impending death, all of which may be relieved by an hypodermic injection of strychnine.

But angina pectoris may occur as a muscular or neuralgic affection, without any evidence of coexisting disease of the heart or aorta. The symptoms then differ from the above. There is not the same necessity of keeping a fixed position, for the patient may, and often does, writhe with pain, and tries frequent changes of posture. The sense of impending death is less, or may be wanting, etc.

Romberg regarded angina pectoris as an hyperæsthesia of the cardiac plexus, and these nerves were assumed to be the sole source of the pain.

But, as Niemeyer says, this so-called cardiac neuralgia is apt to extend with great intensity along the brachial plexus; and also adds that this transfer of the morbid excitement from the nerves of the heart to those of the arm is

best explained by the intervention of the nervus cardiacus magnus and parvus, as they originate from the middle and inferior cervical ganglia, which are connected by many twigs with the inferior cervical nerves.

Trousseau gives a number of cases of the neuralgic variety, and regards the disease as an epileptiform neuralgia, and says it often commences like an epileptic aura in the left arm, or some other part, and so runs to the heart. He places the seat of the disorder in the cardiac branches of the pneumogastric nerve, from whence he thinks it radiates to the cervical and brachial plexuses.

Others place the seat of the disease in the moderating or inhibiting nerves of the heart.

In 1848, Bridge, Weber, and Claude Bernard discovered, almost at the same time, that excitation of the pneumogastric nerve, or of its peripheral extremity only, retarded the motion of the heart. Since then the idea has become familiar to us of nerves possessing paralyzing or inhibiting properties, and it is now generally admitted that the pneumogastric nerve slows the action of the heart, or depresses, or moderates, or inhibits, its action; and the more this nerve is excited the more the heart will be apt to stop beating.

There are also accelerating nerves of the heart, and both moderating and accelerating ganglions. The ganglion of Remak, seated at the opening of the lower vena cava; the ganglion of Bidder, situated in the left auriculo-ventricular septum; and the ganglion of Ludwig, in the inter-auricular septum—all have different functions. The two former appear to be centres of excitation, and the latter of moderating or inhibiting the action of the heart.

Treatment.—Arsenic is spoken highly of in neuralgia by Drs. Hughes and Crosse; and Dr. Anstie speaks approvingly of it in angina pectoris, which he regards as a neuralgia, and states that it will lessen the severity of the attacks,

reducing them, in time, to a mere sense of tightness of the chest.

Trousseau quotes the case of a man aged fifty-seven who got rid of a very severe angina pectoris by taking six drops three times a day of Fowler's solution. Waring says it has been employed with varying success, and often fails, but many examples of its successful employment are on record. It is impossible to say how it acts in effecting a cure, for it can scarcely be doubted that it may produce a wide-spread granular or fatty degeneration of the tissues. The liver may become more fatty and enlarged than in the phosphorus liver; the kidneys may be seriously affected, their tubes choked up with fat globules, while the muscles of the heart and diaphragm are almost equally compromised in severe cases of arsenic poisoning.

To aconite is assigned an important role in the treatment of a large class of neuralgic affections, which Waring calls congestive, and believes it to be appropriate in some forms of angina pectoris, spasmodic asthma, and convulsive cough

Tincture of assafœtida ʒss, with tinct. opii. m. xx, spts. ether sulph. ʒss, and mist. camphoræ ʒiss, is said to be occasionally of great use as a palliative in some of the attacks.

Belladonna.—Dr. Joy states that a belladonna plaster over the præcordial region, renewed every seven or ten days, often procures a very considerable alleviation of the attacks. But Bretonneau and Trousseau were the great advocates of the belladonna treatment, in doses of 1-10th grain each of the extract and powdered root, once a day, in the morning before breakfast, for the three days; then two pills for ten days; then three for twenty days. If no improvement followed, four pills were given at one dose, and the quantity increased by 1-5th of a grain every ten days, unless unpleasant symptoms followed. This is precisely Trousseau's treatment for epilepsy, as he regarded angina pectoris, in many cases, as only an epileptiform neuralgia, preceded by a kind of aura

epileptica. Belladonna is supposed to sustain the action of the heart and arteries, and to prevent paralysis from over distention. Trousseau cured one case with belladonna over the heart, applied to the arm-pit, from which the aura started. Stramonium over the heart, applied to the sternum, cured another case.

Camphor was spoken favorably of by Dr. Copland, especially when given in combination with opium or hydrocyanic acid. When five or ten grains are given, a feeling of exhilaration is usually induced, attended with a sense of comfort or quietness, especially marked in those previously suffering from nervousness. It is largely used as an antispasmodic, and to quiet restlessness and nervousness. It readily passes into the blood, but its influence upon the heart seems to be capricious. Moderate doses quicken and strengthen the pulse.

Chamomile is an excellent remedy in the spasmodic or pseudo-neuralgic affection of hysterical persons, more especially in pseudo-angina pectoris and the colicky attack to which such persons are very liable; four to six minims of oil is the best dose. It lowers reflex irritability, even that produced by strychnine. It is most useful in those attacks of angina which are easily produced by derangement of the digestive organs.

Cherry laurel acts like prussic acid, and Phillips says the attacks of pain which occur in angina pectoris, and which in situation and course so closely resemble gastrodynia, are often more quickly relieved by laurel water and prussic acid than by any agent at our command. The dose of aqua laurocerasi is from five to thirty minims.

Ferri-peroxidum is spoken of by Dr. Hope as one of the most efficacious internal remedies, when angina pectoris is attended by any degree of anæmia; and it may also be useful when there is fatty degeneration of the heart. It was formerly given in doses of thirty to ninety grains, thrice daily.

Hydrocyanic acid has been successfully employed by Brugnatelli, Granville, and others. Schlessia relates a very severe case which, after resisting all other remedies, yielded immediately to prussic acid. It is regarded as a cardiac sedative by H. C. Wood, and large doses produce instantaneous diastolic arrest of the heart, which may be permanent. It first stimulates and then paralyzes the cardiac inhibitory apparatus, most probably in its entres. It lessens the respirations, and acts upon the peripheral ends of the vagi.

Lactuca virosa was used successfully by Schlesingle in doses of two grains, combined with ½ grain of digitalis, every two hours. It is regarded as sedative and diaphoretic.

Opium was recommended on the high authority of Dr. Walshe as the best remedy in some of the emergencies of this frightful disorder; but recent observations have shown that ether, hot brandy, and water, and other diffusible stimuli, afford more speedy relief. Dr. Allbutt strongly recommends a morphia hypodermic injection in the dyspnœa of heart disease and the pain of angina pectoris. It removes dyspnœa, strengthens the heart, and removes congestion.

Nitrite of amyl, prepared by the action of nitric acid on amylic alcohol, or fusil oil, was first employed by Dr. Brunton in one form of angina pectoris with signal success, and he found it more effective than any other remedy in this painful and dangerous disease. Anstie and Talford Jones have also been successful with it, but Ringer had a case in which it abated the pain for a few seconds only, when it returned with its former severity and lasted the usual time. In this case it was employed many times in a great many attacks, with the same ill success. It so happened that Dr. Brunton gave it in the class of cases to which it is adapted, and Dr. Ringer, probably, did not. In Brunton's first case there was throbbing of the heart's carotids as high up as the ears, with severe præcordial pain extending to the right arm. The usual characteristic sense of impending death

was absent. The pulse was quickened, and the arterial tension, as traced by the sphygnograph, was much increased from contraction of the small systemic vessels. It was this increased tension which first led Dr. Brunton to employ the nitrite of amyl, for, in the case in question, he thought that the attack consisted of spasmodic contraction of some, if not all, of the small systemic and pulmonary vessels, which spasm gave way on inhaling the nitrite, and the pain then disappeared. On recurrences of the attack the patient always inhaled thenitrite of amyl, and always obtained instantaneous relief. According to this view, the attack in this case consisted in an epileptic spasm of the pulmonary and other arteries, andthe nitrite of amyl is admirably adapted to relieve such a state; for the most prominent symptoms caused by its inhalation are a sense of great fullness and distension of the head, with intense flushing of the face, deep, labored respiration, and an exceedingly rapid and violent action of the heart. The arterial pressure is much diminished, and the whole attack is due to dilatation of the capillaries, arising from a direct paralyzing action of the drug upon the coats of the arterioles, while it does not lessen, but rather increases, the action of the heart. Dr. H. C. Wood says the pathology of some of these cases of heart-pang is not definitely made out, but there is now abundant evidence of the value of nitrite of amyl in relieving, in some cases almost instantly, an agony which has resisted all other treatment. This appears also true, whether valvular disease or mere functional disease exists. But in cases of advanced fatty degeneration or very great dilatation of the heart, he thinks its use would be attended with danger, owing to its effect on the heart muscle. But this fear will be unfounded, unless the action of the drug be pushed very far. In Anstie's and Madden's cases there seems to have been paralytic distention of the heart. In the former, the first sniff of the nitrite produced the characteristic flushing of the face and a sense

of fulness of the head, and as soon as the blood pressure, or the heart, was relieved by the induced paralysis of the smaller arteries, the heart gave one strong beat, and the patient passed from a state of agony to one of perfect repose and peace. This happy experience has now been repeated several times, and the patient is able to cut short all his paroxysms, and has discarded the use of ether and greatly reduced his allowance of stimulants. Dr. Henry Madden repeatedly experienced, in his own person, the beneficial action of the nitrite in cutting short attacks of angina pectoris from organic disease of the heart. He always inhaled five drops, and the effect was wonderful, the spasm being checked in two minutes, and, although the frequency of the paroxysms was not diminished for some time, yet they were trifling in force compared with their predecessors; but gradually they became less and less frequent, and finally ceased altogether. The drug always produced the usual symptoms in the head, violent commotion in the chest, tumultuous action of the heart, and quick respiration. In severe attacks the full action of the medicine, with its concomitant vascular commotion, was quite essential, for the pain never began to yield until the heart was quite violently agitated. Dr. M. had a feeling which may have come from distention of the heart, as it seemed to him as if the front of the chest was bulged out into a convex prominence. Hence, in Anstie's and Madden's cases, the relaxation of the distant capillaries seems to have taken off the pressure of blood down into the ventricles, and then vigorous contractions of the heart relieved it of its paralytic distention. A hypodermic injection of strychnine may accomplish the same object.

Soda was first suggested by Bretonneau, on the supposition that the complaint was due to calcareous concretions in the first part of the aorta, and he thought that the prolonged use of bicarbonate of soda, from which such good effects are

obtained in the calculous diathesis, might prove beneficial. In the first case there was no favorable change for two months, but the patient was no worse; then he manifestly improved, and after the regular use of artificial Vichy water for six months he got rid entirely of all his symptoms of angina pectoris. Bretonneau often repeated this treatment, and he treated several cases successfully. He first gave twenty grains of soda before each of the two principal meals, and gradually increased it to forty and fifty grains; sometimes one hundred and sixty to two hundred grains were taken in a day. A so-called course of soda lasted ten days, then there was an intermission of two or three weeks, when the soda was resumed, and this treatment was thus continued for a year, then omitted for several months and re-commenced again. He also gave belladonna continuously, although Trousseau often laughed heartily at this chemical treatment. It is admirably adapted to remove fatty degeneration, which is one of the most frequent concomitants of the disease, and, if combined with regular doses of nux vomica to relieve the debility of the heart, is well worthy of renewed attention.

Sulphur was recommended by Dr. Munk in angina pectoris, spasmodic asthma, and other spasmodic affections of the chest, in doses of 3ss–3j once or twice daily.

Iodide of potash was used by Dr. Oliver, of Maas, with great benefit in his own person.

ART. III.—The Therapeutic Action and Uses of the Turkish Bath; with a Sketch of the History, Nature, Advantages, and Processes of the Modern Improved Turkish Bath. By JNO. S. WILSON, M.D., Atlanta, Ga.

Some form of what is now called the Turkish bath existed among the Greeks, Romans, and other nations, as far back as history extends. But it was used by the ancients, as it is now by the Turks, as a luxury, and not as a remedy. Still

there is good reason to believe that the remarkable health and longevity of those who resorted to it was largely due to its use.

The scientific remedial use of the Turkish bath on rational principles may be dated only about twenty years ago, when it was introduced into Great Britain by Mr. David Urquhart. Since then its use has rapidly extended in Europe and in this country; and the verdict of the most distinguished authorities is, that it is a therapeutic agent unequaled in the correctness of its principles, as tested by modern science; in safety, in efficacy, and in the extent of its applicability to the treatment of disease, as demonstrated by the happy experience of physicians and people. This is true of the improved Turkish bath, which differs from the bath as used by the Turks in the high and graded temperatures of our baths; in the exclusion of the unscientific and violent shampooing as practiced by them; and, above all, in the *dryness* of the air of our improved baths.

The Turkish bath, then, is not a steam or vapor bath, but a *dry, hot-air* bath. If steam is used at all, it is only for the purpose of heating coils of pipe, the heat being radiated from these coils, with no escape of steam into the rooms. Whenever steam or vapor is diffused through the rooms, the essential distinguishing feature of the Turkish bath is gone, and such a bath should not be called a Turkish, but a Russian or vapor bath, which is far inferior, as we shall see.

In the Turkish bath of which I am speaking the dry air comes in contact not only with the two thousand square inches of the skin, but with the twenty thousand square inches of the lungs, and it is hardly necessary to remind physicians that such a bath must be far superior to any box-bath, with the head out, or any bath in which a room is filled with steam that can not be breathed, nor borne at a high temperature, and which retards instead of favoring perspiration. Of this more hereafter.

Another essential feature of a Turkish bath is to have rooms of *different temperatures*, to suit individual cases.

Another, still, is to have a separate room for shampooing, where the *heat can be raised much higher* than in a vapor bath. The advantages of the hot-air bath may be briefly summed up thus: 1st. This air comes in contact with the twenty thousand square inches of the cell-structure of the lungs. 2d. It can be breathed not only without injury, but with positive delight, to the very bottom of the lungs, at a temperature of 150°, 200°, or higher, while vapor can hardly be breathed at all at a temperature of 110° or 120°, and is oppressive and unnatural to inhale at any temperature. 3d. Vapor retards instead of favoring perspiration, while the hot air of the Turkish bath is better than any thing else for this purpose, on account of its levity, its dryness, and the much higher temperature to which it can be raised. 4th. From this high dry heat we have a direct and powerful remedial agent not attainable in a vapor bath.

Processes of the Turkish Bath.—Every Turkish bath should have not less than four large, well-ventilated rooms. These are the *Frigidarium*, or cooling-room; the *Tepidarium*, tepid or first warm-room; the *Calidarium*, or hot-room; and the *Lavatorium*, or wash-room.

The bather first enters the frigidarium, where he undresses, and passes into the tepidarium, the temperature of which ranges from 110° to 140°. The object of this room is to solicit a general perspiration, without any undue excitement or oppression, before going into the next or hot-room. My practice is to promote these ends by the use of warm foot-baths and cold, wet cloths to the head.

When a general moisture appears on the skin, the bather is passed into the calidarium, hot or sweating-room, which is heated from 140° to 180° or 200°. In in this room the shampooing is done, as it always should be, to obtain the benefits of this important part of the process. As a general rule, the

shampooing should be done with the *hands* only. Except in some rare cases, neither flesh-brushes nor coarse, rough cloths should be used in the Turkish bath, because they are useless, and might in some cases be injurious.

After sweating, shampooing, percussing, and soaping our bather in the calidarium, he next passes into the lavatorium, or wash-room. In this room he begins with a warm shower-bath, which is gradually changed to cool, and then cold. This not only cleanses him, but it closes the pores and causes a vigorous reaction. This last important result is always readily obtained after passing through the hot-air bath, the feeblest persons reacting without difficulty. I object to the plunge-bath, as used by many, because the shower will accomplish all that is necessary without the shock of a plunge, which is unpleasant, and, in some cases, might be dangerous.

The bather, having now passed through the bath, returns to the frigidarium, or cooling-room, where he is directed to dress slowly; or, if he is disposed to a secondary perspiration, he is wrapped in a sheet or blanket, and reclines on a lounge until he is "all right," or free from perspiration.

Thus have I given a brief sketch of the processes of this grand bath, so that physicians may better appreciate its therapeutic action, and distinguish between the real Turkish hot-air bath, and vapor box Russian bath, etc.

Let us now turn our attention to that most interesting subject—

The Therapeutic Action and Uses of the Turkish Bath.—Every one who understands the processes and physiological action of the Turkish bath will readily see that its essential feature, its great point of excellence over all other baths, is the immersion of the whole body, including the head, in *dry, hot* air, thus bringing this air in contact not only with the skin, but also with the much more extensive cellular structure of the lungs. The functions of the skin, and their importance to health, are too well known to detain us with any extended

account of its physiology. All physicians are familiar with the experiments of Magendie, Foucault, and other French physiologists, who have proved that coating the skin of pigs, dogs, and other animals with any impervious substance results in asphyxia, disease, and speedy death. It may also be remembered that Foucault has demonstrated that even *partial* coating of the skin causes a variety of diseases, and especially scrofula, paralysis, consumption, and all that formidable class of affections arising from malnutrition and the retention of poisonous matters in the system. And such effects are not at all surprising when we call to mind the fact that through the skin are discharged not only water, but carbonic acid, urea, bile, fatty matters, drugs of all kinds, and in short all kinds of poisons, whether introduced from without or generated within from disease, or from arrest of the secretions and excretions.

It will thus be seen that the skin is capable of supplementing, to a great extent, the depurating action of the lungs, kidneys, liver, and other organs, and that by its usual and direct, and also by its *vicarious* action, a greater quantity of effete and deleterious matter may be safely removed from the system than through any other channel. All this being admitted, it will be as readily conceded that diaphoretics are the most valuable of all our remedies, and a practical exemplification of this is found in the fact that no class of medicines is more used in the practice of all physicians. Yet all will agree that none are more uncertain and unreliable, and that the most effective remedies of this class make heavy drafts on the vitality of patients by their relaxing, depressing action. How desirable, then, to have an agent that will certainly, speedily, and pleasantly excite perspiration to any desired extent, not only without exhaustion or depression, but with increased strength and vigor. In the Turkish hot-air bath we have such an agent. As to its power as a diaphoretic it is needless to argue. It is enough to say

that it *never fails.* The *light, dry* air of this bath, heated to a temperature of from 120° to 160°, will sweat any thing covered with skin and permeated with vessels in which blood can circulate. But the invigorating effects of this bath may be doubted by some physicians, who seem to fall into the popular error that it is actually debilitating, and that only a strong person should venture on it. Nothing could be further from the truth. Perspiration, in a certain class of diseases, is a symptom of weakness, but there is nothing in the nature of this discharge to sustain the idea that it is debilitating. It is well known that the matters thus eliminated from the system are composed almost exclusively of water and various salts and effete substances, which are not only useless but oppressive when retained, interfering with the proper performance of all the vital functions by poisoning and obstructing the fountains of life. But, as satisfactory as are the teachings of physiology on this subject, daily observation and experience are still more conclusive. In proof of this I have only to refer to workers in foundries, shampooers in Turkish baths, and many other occupations in which the body is subjected to a temperature of from 120° to 150° of dry air all day, with, of course, profuse perspiration. And yet there is no class of men more healthy and robust than these sweltering toilers in what would seem to be intolerable heat. And the same is true of field laborers and many others who are bathed in sweat from morning to night. My shampooer works from eight to fourteen hours every day, in a temperature of from 120° to 180°, and loses nothing in health, strength, or spirits, and he goes, without clothing, from the last named temperature into the pump-room many times a day, pumping water, and such is the case with many others, thus showing that there is no danger in the great changes of temperature, which is the bug-bear of some physicians who do not seem to understand the philosophy or the practice of the Turkish bath.

The position that this bath is not debilitating, but, on the contrary, highly tonic and invigorating, could be sustained by almost numberless authorities of the highest character, but I deem it unnecessary to adduce them. I can say truly that I have carried the feeblest women and infants through my bath, and I have yet to see the first evidences of exhaustion or even depression from its action. It invariably imparts strength, buoyancy, and vigor, both of mind and body. And what better calculated to act as a depurator, tonic, and invigorator than the Turkish bath, with its combination of hot and cool air, warm and cold water, friction and shampooing, its stimulus of heat and reaction of cold, its electricity and magnetism, acting as no other agent or combination of agents can act?

Well does Dr. Thudicum say that "you can remove as much of the poisonous and effete matter from the body in one hour in the Turkish bath as can be removed by any other means in twenty-four hours." And he might have added that the removal of such matters, combined with the frictions, etc., which are a part of this bath, must give a spring tone and vigor to the whole man which nothing else can give. The Turkish bath, then, is superior to all other remedies as a depurator, tonic, and invigorator. It not only cleanses the skin as nothing else can do, but it is equally effectual in purifying the blood, doing this as thoroughly as a sponge is cleansed by wringing it frequently out of pure water.

2. It equalizes the circulation and removes congestion more effectually than any kind of bath or any other remedy.

This can be readily understood when we call to mind the fact that some forty miles of sweating tubes are relieved from the ordinary atmospheric pressure and drawn on by the highly rarefied and dry air of the bath, thus exerting an enormous suction power, which causes a very strong centrifugal current, draining the congested internal organs, and

then this centrifugal action is continued and established by the shampooing and the tonic stimulating action of the cold water, which follows the hot air and the shampooing.

3. The Turkish bath has a very powerful influence on the superficial nerves of the skin, and, through them, on the whole nervous system, voluntary and involuntary.

Under the rousing effect of the high heat, combined with friction and followed by cold water, the nervous ramifications of the skin send revivifying, healthful currents to the nervous centres, and these, responding to the impression, return other nerve currents to the surface; and thus are established that action and reaction in the nervous system—the motive power of the body—which is the very essence of health, strength, and vigor, and the source of those harmonious movements in all the functions, that delightful repose of mind and body which the Turkish bath alone can give. Such is the effect of a bath through the distal nervous ramifications. Of course the direct effect on the brain and other nervous centers, from its equalizing, eliminating, and depurating action, must be very great.

4. This bath not only purifies the skin and blood by perspiration, equalizes the circulation, and tones and invigorates the whole system; it is also the medium through which the elements of health and vitality are directly imparted and the germs of disease are destroyed. In this bath oxygen at a high temperature is supplied to the blood, and this oxygen produces its vital and chemical effects for more energetically than at the ordinary temperature. At the temperature of this bath it must oxygenate and consume organic impurities, destroy fermenting matters and virus germs. And besides this salutary destructive oxygenation, the highly heated air doubtless exerts a potent electrical influence on the blood and nerves, while through the stimulating and expansive action of the heat, absorption of oxygen must also be much increased. The action of the heat of this bath,

as indicated through the 20,000 square inches of the air cells, as well as on the skin, can hardly be over-estimated, thus giving the Turkish bath, in which a high heat can alone be obtained and borne, a most decided advantage over the vapor and all other baths, whether used with head and body in the bath or with the head out, as in the box-bath, which some take, thinking that they have had a Turkish bath, or at least a good substitute for it. Never was a greater mistake made. These baths may do for home use in the absence of any thing better, but to use them as a Turkish bath, or to call them such, is to bring reproach on the only perfect bath —the modern, improved, all over, hot-air bath, with its different rooms of graded temperatures, its hot rooms for shampooing, and its dry-room air applied to the whole skin and lungs at much higher degrees than can be endured in any vapor bath. And here let me meet an objection that may arise in the minds of some. A distinguished physician of this city said to me that he found the hot air acting on the lungs would cause pneumonia. The answer to this is, that my own ample experience, extending over more than two years, has fully demonstrated that this air, so far from having an irritating action on the lungs, has a most delightful, soothing effect, allaying cough, facilitating expectoration, making the breathing deep and easy, removing all feeling of oppression, and exerting the most happy curative action in all pulmonary affections. And such is the testimony of many others. This action is very much like that of a warm poultice to an inflamed surface.

Having now given the general principles on which the Turkish hot-air bath acts, I will briefly notice the application of these principles to specific diseases. And so extensive is the application of these principles, so correct have I found them to be, both in theory and in practice, that I do not consider the language of the distinguished Erasmus Wilson extravagant, when he says: "We do not ask ourselves what

diseases can be cured by the Turkish bath, but what diseases can resist its power to cure."

Leaving the more extended application of the principles set forth to my readers, I will attempt but little more than to mention some of the diseases in which this great remedy seems to be specially indicated, at the same time disclaiming any intention of making it "a panacea for all our woes."

From what has been said of the depurating and equalizing action of this bath, it will at once be admitted that it is the remedy *par excellence* in all inflammatory and congestive diseases, and especially those of the mucous membrane, on account of the close connection between these membranes and the skin. Hence its superiority over any other remedy in bronchitis, acute and chronic; in common colds; in chronic nasal catarrh; in many affections of the conjunctiva; in leucorrhœa, diarrhœa, dysentery, cystitis, and, in short, all inflammations, and especially those of the mucous membranes.

As a preventive and cure of colds and all affections of the air-passages, it is certainly our best remedy. Besides its equalizing effect, the warm, dry air has a wonderfully soothing action on the membrane lining these passages, allaying cough, and promoting a free discharge, as before mentioned. I believe it to be the only truly curative remedy in chronic nasal catarrh, acting as it does by its revolutionizing effect on the whole system, and by its direct effect on the inflamed membrane, thus permanently removing the inflammation and congestion, which are generally only temporarily relieved by local applications. The same is true, to a great extent, of leucorrhœa. And I am satisfied that the very best remedy for croup would be to put the sufferer in a Turkish bath, and let him remain there till relieved. He should then go back into the tepidarium, in a temperature of from 100° to 110°; and, on a return of the symptoms, he should go again into the calidarium, heated from 120° to 140°; thus repeating, again and again, until the disease is subdued.

Whooping-cough is another disease in which I have no doubt that the Turkish bath, by its action, both on the skin, lungs, and mucous membrane, and on the nervous system, would do more than any other remedy, both in relieving the symptoms and in shortening the disease. The same is true of asthma, and in one case in which I have had an opportunity of trying the bath, it has prevented the paroxysm every time it has been used.

In this connection I may also mention pulmonary consumption, though it is a disease of nutrition and not one of the air-passages and mucous membrane, only so far as these are secondarily affected. Reason and facts clearly demonstrate that no remedy is so likely to arrest the progress of this fell destroyer. By the use of this bath we may confidently expect to improve all the nutritive and digestive functions, to remove internal congestions, dilate the air cells, greatly increase oxygenation and decarbonization, promote expectoration, allay cough, check night-sweats, procure sleep, and eliminate the tubercle-producing products from the system.

My own experience with the bath proves that nothing is so well calculated to relieve the distressing symptoms of consumption, and especially the cough and night-sweats.

The above views are corroborated by the testimony of Dr. Leonard, physician to the Infirmary for Diseases of the Chest, London. He has given a detailed statement of a number of cases under his charge successfully treated by the Turkish bath. One patient, killed by accident, furnished positive evidence of the reconstruction of the diseased organs.

In other diseases of the nutritive and digestive organs the Turkish bath is a remedy entitled to far more confidence than any other. Its effects in *dyspepsia* are truly wonderful; and from my own personal observation I can say that it, with proper dieting and exercise, and especially with the

use of the health-lift, will cure all curable cases in a remarkably short time. The strength, appetite, digestion, and assimilation are increased almost from the first bath. Can this much be said for drugs? In *scrofula*, and its kindred disease, *cancer*, the Turkish bath is plainly indicated as the most promising remedy for these formidable affections. Its power over scrofula in giving strength and vigor, in improving digestion, in promoting elimination and nutrition, can not be doubted. As to its use in cancer, Dr. Thudicum says it "will remove conditions accompanying, favoring, or, perhaps, producing that awful disease." Mr. Urquhart gives a case where a removed and returning cancer, "in a desperately hopeless condition," was perfectly cured by the bath. He also tells us that cancer is unknown in countries where the bath is generally used, and where the climate is favorable to the action of the skin.

This bath is a certain and speedy remedy for *obesity*, while it as surely promotes the nutrition of the ill-nourished. When in New York last summer I was told by the proprietor of a Turkish bath that such people lost from five to seven pounds from a single bath, by actual weighing, with a corresponding increase in strength and vigor. But it is proper to add that the loss in weight continued only a few days, the reduction being mostly due to the discharge of water from the fat. To reduce this permanently, the bath should be followed by a proper system of dieting and exercise.

In that general derangement of health known as chlorosis, or green-sickness, the Turkish bath is plainly indicated on account of its action on the nervous system, its tonic effects, and its potent influence over all the digestive and assimilative functions. The same is true of all inflammatory and obstructive affections of the womb, and from the bath we may reasonably expect a more permanent effect than from any local applications. In painful and suppressed menstruation, I can confidently recommend it from my own observation.

In all cases of blood poisoning, whether from drugs or disease, no remedy will compare with the Turkish bath. This position is sustained by a knowledge of its mode of action, by my own personal experience, and by authorities too numerous to mention.

Of course, then, it must be an excellent remedy in syphilis, by eliminating the poison from the system and removing the effects without that injury to the constitution which is so often seen from the use of the ordinary remedies. It can also be recommended in the erysipelatous and furuncular diatheses, and in almost every kind of skin disease, whether of local or constitutional origin. I have not a shadow of doubt that, in all the above affections, the Turkish bath, with its *high* heat and *dry* air, far excels the hot springs of Arkansas, or any vapor or water bath, either medicated or unmedicated. This can be readily understood when the action of this bath is considered, and when it is admitted, as all intelligent physicians are ready to do, that the cures made by the hot springs and by vapor and hot-water baths are due to the action of the heat and not to the minerals in the water. This being admitted, the superiority of the Turkish bath over vapor or water, as a means of applying heat and exciting perspiration, can not for a moment be doubted.

In rheumatism and neuralgia, which may be classed among the blood diseases, the above remarks are equally applicable, and the power of the Turkish bath over these diseases is admitted by all, and amply confirmed by my daily observation of its effects. It never fails to give relief, and its persevering use will cure all curable cases. Here the heat should be higher by many degrees than can be used in any water or vapor bath. I can confidently recommend it in sciatica, when thus used.

In malarial poisoning and chills and fevers the Turkish bath is far better than any drug to remove the poison, arouse the liver, tone the system, and arrest the paroxysms.

This bath also speedily removes whisky, tobacco, opium, and all things from the system, and is the only true and proper "antidote" for these things, removing, at the same time, the offending cause, the effects, and, to a great extent, blunting the morbid craving for these health-destroying agents.

Headaches, which are generally caused by retention of some morbid matters in the system, or by congestion of the brain, are almost invariably relieved by the bath. The same will doubtless prove to be true of the more formidable class of kidney diseases, and especially Bright's disease and diabetes. Says Dr. Von Geisen, speaking of the former: "A judicious use of the bath (Turkish) robs this dreaded disease of half its terrors. The danger of uræmic poisoning is placed at the remotest possible limit, and the instances in which life has been comfortably—nay, *enjoyably*—prolonged, can be counted by hundreds."

Organic disease of the heart has been supposed to contra-indicate the use of the Turkish bath, but the observations of many distinguished physicians have shown that such a presumption is unfounded. In most cases the bath gives decided relief, as we might infer from its depurating and centrifugal action on the circulation, and its sedative effect on the nervous system. In nervous affections of the heart its beneficial effects are manifest, and have often been witnessed by me.

Indeed, as an anodyne, sedative, and anti-spasmodic in all forms of nervous disease, it is superior to any of the remedies so often and unsuccessfully resorted to. Hence it will doubtless be found to be the best remedy in mania-a-potu, hysteria, hydrophobia, Asiatic cholera, tetanus, chorea, and many other diseases attended with preternatural nervous excitement. For sleeplessness I have found it to be an unfailing remedy. It has proved to be the best treatment for insanity. In the Cork lunatic asylum the cures were doubled and the

deaths diminished one-half under its use. The offensive odor from the skin of the insane is soon removed by this bath. The truth is, no personal odor will withstand it. I succeeded in removing the intolerable smell in a case of fœtid perspiration of the feet, of many years' duration, by a single bath.

In most forms of dropsy the Turkish bath is our most hopeful remedy. I have used it successfully in several cases of threatened paralysis, and encouragingly in some cases where the disease was confirmed. Most fevers could doubtless be abated by its early use.

As a beautifier of the complexion it is of course more interesting to the ladies than to physicians, but all who have wives, daughters, or sweethearts should know that it is the only true cosmetic.

As a prophylactic against disease it is of special interest to all classes, and in this respect it has no equal. But there is one point in which it is more particularly interesting to physicians, and that is its power to soothe and compose mind and body after fatigue and mental anxiety. No class suffers more from these than physicians, and in the bath they have a delightful and certain remedy—one that will always be sought again when once enjoyed.

For the sedentary it will answer most of the purposes of active exercise, and in this respect is an invaluable boon to all whose circumstances forbid taking such exercises as are essential to health in the absence of the only substitute—the Turkish bath.

Such is a very brief outline of what might be said on the action and uses of this perfection of baths, which is daily growing in popular and professional favor, and which has already received the indorsement of the leading authorities in medicine. Among these I will only give the following names: Erasmus Wilson, Spencer Wells, Sir Benjamin Brodie, Drs. Armstrong and Barter, of Europe; Drs. Wood,

Doremus, Emmett, Mott, the two Flints, Drs. Agnew, Hammond, Sayre, and Sims, of New York, and hundreds of others whose names it were a useless and endless task to mention.

ORIGINAL LECTURES.

ART. IV.—*History of the Discovery of the Circulation of the Blood.* Delivered February 1, at Starling Medical College, Columbus, Ohio, by W. J. CONKLIN M.D., Professor of Physiology.

On a beautiful Sunday afternoon in the fall of 1642 was fought the battle of Edgehill, so memorable in English history. The scene on that October evening was a remarkable one, and has a peculiar interest for us as physicians, aside from its influence on the civil liberties of England.

In the foreground lies the little town of Keinton, while in the distance is seen the vast expanse of woody Warwickshire, already resplendent in its autumnal coloring.

King Charles the First, with his handsome, melancholy face reflecting the fitful gleams which fortune sends over the royal arms, is there as the central figure. A little to one side, sheltered by a hedge, is seen a group of three, whose employment contrasts strangely with the warlike nature of their surroundings. Let us draw nearer to this group.

Reclining on the ground, deeply absorbed in reading a book, is a man of the lowest stature, olivaster complexion, a black, piercing eye, whose hoary locks tell the story of more than three score years. Around him are two children familiarly playing, now interrupting his studies with some childish question, and again watching the ebb and flow of the battle in the near distance.

The elderly man is Dr. William Harvey, physician to the royal family. The children are the young Prince and Duke

of York, afterwards Charles II. and James II. Soon a bullet from a great gun plows the ground near them, which causes the aged physician to close his book and remove his royal charges to a safer location.

We have chosen this moment to introduce to you Dr. Harvey, the illustrious discoverer of the circulation of the blood, not because the battle-field or his connection with royalty add any thing to his glory or prominently reflect his character. We have chosen it rather because the coolness, the courage, the force of character, and the entire consecration to his work which would lead him to prosecute his studies with the fight going on around him, *are characteristic* of the man.

We can not attribute Harvey's behavior on this occasion to indifference to the fortunes of his patron and king, for while we scarcely expect to find him in full sympathy with the effort to overthrow parliament and English Puritanism, yet King Charles had been his friend and protector.

Vacillating and repulsive as is the character of Charles in many respects, when we look upon him as the friend of science, as the patron of a Van Dyke and a Rubens, and see him in the laboratory, sitting an enthusiastic disciple at the feet of the "crack-brained circulator," as Harvey was jealously nick-named, going over, step by step, the proofs of the new theory, we find abundant reason for Harvey's adherence to his person.

Having just completed our study of the blood and the mechanism by which it is enabled to run its fertilizing course throughout the organism, it will be both interesting and profitable for us to go briefly over the history of the discovery of the circulation of the blood. This history possesses more than ordinary interest now, both from the nearness of Harvey's tercentenary (1878), at which a proper memorial will be placed in Folkstone, his birth-place, and from the numerous impeachments to Harvey's title as discoverer which have been recently published.

These, however, are mostly revivals of the same claims of which Haller long ago said: "Others at length, that could not withstand their own eyes and the just sentence of all Europe in its favor, were invidiously for depriving our British Hippocrates, who pulled off the blind-fold from physic, of the honors due from so great discoveries, by fishing them out from the dark waters of his predecessors."

A late memoir (1876) by Henri Tollin, of Magdeburg, brings to the surface once more the oft-repeated claims of Michael Servetus, one of the most remarkable men of his day, and whose tragic fate always awakens our deepest sympathies. A memorial tablet recently placed in one of the halls in the University of Bologna proclaims Carlo Ruini to have been the first to point out the true course of the blood. But a few weeks ago (October, 1876,) there was unveiled in the University of Rome a monument in honor of Andreas Cesalpinus, the great naturalist, for whom the Italian *savans* claim the honor of the great discovery, and now it is proposed to inscribe over the portals of the University of Pisa, in which Cesalpinus was lecturer on medicine, the unkind and unbecoming insinuation, "Ill-advised was the English Harvey, who, in 1628, dared to arrogate to himself the discovery of this mighty truth."

No wonder that rival nations and rival schools should contend for the honor of the discovery of the blood's circulation, for it is the fundamental fact of a rational physiology. It is the keystone of the physiological arch, upon which is reared the vast superstructure of modern medicine.

The circulation of the blood seems to us such a simple fact that we can scarcely realize the struggle which its discovery cost the human intellect. But discoveries usually have long histories. They represent ages of toil and study, of efforts misdirected, and, in fact, oftentimes seem to run through the whole alphabet of failures before their success is spelled out. The accidental experiment with the frog's

thigh in the laboratory of Galvani represents the beginning; the subtle fluid harnessed to gigantic magnets and made to lift prodigious burdens, or as message-bearer mounting the wires and circling the globe, represents the present; between which there runs a long and bitter history of experiment and failure, much the larger portion of which is still unwritten.

So with the circulation. Long years labored at the birth. Erasistratus taught that the arteries were air-tubes. Galen showed them to be filled with blood. Step by step, Vesalius, Servetus, Realdus Columbus, Fabricius, and a host of others, blazed the way for the immortal genius of Harvey. Thus the seed sown in one age ripens into fruit in another age, when the hand of the sower perhaps is dust.

The recorded thoughts of every man are undying. Others appropriate, advance, apply them, and thus many minds are required to secure the immortality of one.

In order to more intelligently trace the birth of the modern theory of the circulation, let us take a rapid survey of the physiology of the pre-Harveian days, so far as it affects the subject under discussion.

One of the most difficult lessons which the human mind has ever had submitted to it was to learn to accept the testimony of the senses. To us, living in the last quarter of the nineteenth century, a century as remarkable for its iconoclastic propensities as for its rapid scientific advancement, this seems hardly credible.

Ancient medicine concerned itself only with the proofs of authority. Modern medicine relies almost wholly upon the proofs of experiment and experience. In the pre-Harveian days no authority was recognized but that which emanated from the oracle of Cos, or the divine apostle of Pergamos, as Hippocrates and Galen were reverentially named. The doctrines of Galen, a man who by his own account was twice called by the god Apollo to study medicine, and of whom the

emperor Marcus Aurelius said, "We have but one physician; Galen is the only man of the faculty," were universally held to be true, and to doubt was medical heresy. An unbroken succession of anatomists for fourteen hundred years studied their dissections through Galenic spectacles, until Vesalius, the bold Fleming, dared assert that Galen's descriptions, drawn from the dissections of monkeys, did not correctly represent human anatomy.

The schooling of Vesalius on the hill of Montfaucon, disputing with dogs and vultures for the bodies of criminals, or at the risk of his life disinterring bodies from cemeteries, was not calculated to increase reverence for the teachings of the past, but gave him that moral courage to burst open the seal of authority which had so long hermetically locked up all medical progress.

The physiology of Galen, which with slight modifications was the doctrine which was taught Harvey at Padua, honored the liver as the central organ of vegetative life.

The liver was the seat of sanguification and the origin of the veins, which were considered the only true blood-vessels, the arteries containing a mixture of spirits and blood. The heart, instead of being the active agent in the distribution of the blood, was a mere cistern; its sole function being the generation of heat and vital spirits.

Three kinds of spirits were recognized: the natural, the vital, and the animal. The natural spirits were located in the liver, the vital in the heart, and the more ambitious animal spirits claimed a residence in the brain.

The prevalent theory of sanguification, then, as summed up by Flourens, is, "the aliment taken into the body was converted into chyle by the stomach and intestines; blood was formed from this chyle in the liver; the vital spirits were exhalations from the blood in the heart, and the animal spirits were elaborated from the vital in the brain. Finally, the blood acquired its temperature from the heart,

and the heart found in the blood the aliment for its innate heat."

Before this hypothesis of the spirits required a modification of the prevailing belief, it was held that the only motion of the blood was simply that of ebb and flow, "like the tide of Euripus" —the blood in the respective vessels simply passing between the heart and the extremities without intermingling. The hypothesis of the spirits required the intermixture of the two kinds of blood, and Galen, drawing upon the imagination for his facts, wisely announces that the partition between the two sides of the heart is perforated.

What a commentary on the value of human evidence, when a long line of illustrious anatomists, including such as Mondini, who revived human dissection, Barenger de Carpi, and Le Vasseur came forward and confirmed from their own dissections the presence of these openings. In the doctrines so far examined there is but little improvement over that of the Chinese, who believed that the circulation of the radical humors and vital heat began at three o'clock in the morning, reached the lungs in the course of the day, and terminated in the liver at the end of twenty-four hours.

While Galen perpetuated by the weight of his great authority many erroneous views concerning the circulation of the blood, he really inserted the first round in the ladder of discovery when he experimentally proved the arteries to be carriers of blood instead of air, as the etymology of the word indicates.

Our next object must be to close the direct passage between the right and left hearts, the necessity for which communication we have already passed in review; and for this purpose let us call to our assistance Andreas Vesalius. Barengarius first expressed doubts as to the presence of this opening, but it was reserved for Vesalius to boldly announce that the auricular septum is solid, no less so than the rest of the heart,

and that not a single drop of blood can pass through the partition. It seems inconceivable that his master mind did not grasp the pulmonary circulation, upon the border-land of which he now stood, but Vesalius failed to recognize the importance of his discovery. It was reserved for another to light up the true pathway of the blood through the lungs—Michael Servetus. Servetus was born at Villaneuva, in Arragon, in 1557, and though educated for the medical profession, soon became involved in the bitter religious controversies of his time. Strange as it seems, his exposition of the pulmonary circulation is buried under a mass of theological rubbish in a book having for its title "Christianismi Restitutio," where it is stated the blood passes from the right to the left side of the heart by a long and wonderful route through the lungs, where it is agitated and prepared, becomes yellow, and passes from the arterial vein to the venous artery.

We have here not only the pulmonary circulation pointed out, but also foreshadowed the office of the lungs, and the work of that magic artist, oxygen, in painting blue blood with arterial tints. However, when we find Servetus still regarding the liver as the fountain-head of the blood, describing the brain as a cushion for the animal spirits, the nerves as a third class of vessels continued from the arteries, pointing out how the air passes from the nose into the ventricles of the brain, and how the devil takes the same route to the soul, there is abundant reason for skepticism as to the extent and accuracy of his physiological knowledge.

Servetus fell a victim to the intolerance of Calvin, and in 1553 was burnt at Geneva, and every copy of his works was committed to the flames with him. But one copy remains, and it is all scorched and blackened by the fire that burned its author. Is it not significant that the only surviving copy should have belonged to Colladon, one of the accusers of the unfortunate Servetus? There stands the book in the library of the Institute of France, all blackened and charred, with

the very passages underscored upon which Colladon accused Servetus, eloquent in its mute denunciation of the religious intolerance and bigotry of the age which gave it birth.

Although the pulmonary circulation was first suggested by Servetus, it is questionable whether the profession is indebted to him as much as to Realdus Columbus, who independently discovered the same truth six years afterwards. Columbus demonstrated the course of the blood through the lungs by means of vivisections, and taught it from his chair in the University of Padua, and to whom Harvey acknowledges his indebtedness. To him the pulmonary circulation was not a physiological hypothesis to illustrate a theological dogma, but was the logical deduction from anatomical facts.

Very soon Andreas Cesalpinus, the pupil and successor of Columbus, announces for the third time the discovery of the pulmonary circulation, it is claimed, independently of his illustrious teacher, though by this time the doctrine must have been common property. This peripatetic philosopher seems to have been far in advance of his contemporaries in his views of the circulation, and has frequently been credited with a knowledge not only of the pulmonary but also of the systemic circulation. Flourens, in his admirable little work on the discovery of the circulation, gives Cesalpinus the double honor of having been the first to give us a method in science and the first to point out the two circulations. We have already alluded to the recent claims of the Italian physicians, who, not content with erecting a monument to his honor, now propose, in a tablet in the University of Pisa, to brand Harvey before the world as a plagiarist.

Cesalpinus was born in Arezzo, Tuscany, in 1519; resigned the professorship of medicine which he held in the University of Pisa to become physician to Pope Clement VIII., and died at Rome in 1603. He was evidently a man of large learning, and ranked high as a naturalist as well as a physician. He undoubtedly did good service in the work of

discovery, as he was the first to apply the term *circulation* to the movement of the blood, and was acquainted with the important fact that when a vein is tied it fills below and not above the ligature. Skepticism as to his knowledge of the systemic circulation is certainly admissible when we find him ignorant of the valves in the veins, and see him explaining the distal swelling of a vein after the application of a ligature, in the effort of the blood to get back to the heart lest it be cut off and suffocated, and hear him speak of the flux and reflux of the blood. In order to give you a more correct idea of the justness of these recent claims, permit me to quote two passages from the great work of Cesalpinus, "Quæstiones Peripateticæ," for which, as for many other facts herein stated, I am indebted to Dr. S. Gamgee's recent essays in the London Lancet:

"In living creatures we see the aliment conducted through the veins to the heart, as though that were the manufactory of innate heat, and it having there attained its ultimate perfection, distributed through the arteries into the whole body by *the action of the spirit* (*agente spiritu*), which is produced in the heart out of the same aliment."

Again:

"Since, however, when we are awake the movement of native heat is outwards (that is, to the sensoria), but in sleep inwards (that is, to the heart), we must suppose that when we are awake a quantity of spirit and of blood is carried to the arteries, for from them is the passage to the nerves; but that in sleep the same heat returns to the heart through the veins—not through the arteries—for the natural passage into the heart is afforded by the vena cava, not by the artery. The pulsations are a proof of this; for these, in waking persons, are strong, violent, rapid, and frequent, with a certain vibration, but in sleep are weak, languid, slow, and rare. For in sleep the native heat passes less in the arteries; it forces its way into them with more violence when persons wake up. The veins are, however, just the contrary, for they are more swollen in sleep, but thinner when we awake, as is clear to any one who looks at the veins in the hand. For the native heat passes in sleep from the arteries into the veins through the communion of the mouths, which they call anastomoses, and thence to the heart. As, however, the overflowing of the blood to the higher parts, and its return to the lower parts, like the Euripus, is

manifest in sleep and in wakefulness, so a movement of this kind is perceived without difficulty in whatever part of the body a ligature is employed, or the veins are in any way closed; for where the through passage is denied, the streams swell up in the part where they are accustomed to flow."

We have here no conception of the heart as the cause of the blood's movement. We have again repeated the old error of a union of blood and spirit, and the absurd doctrine taught that the blood and spirit passes from the arteries into the veins only during sleep.

Is this the doctrine of the circulation as taught by Harvey? Is it upon such passages as these that the Italian school propose to placard Harvey as a fraud?

But even if Cesalpinus did comprehend the circulation, did the world learn it from him? As Dr. Gamgee well says:

"The testimony of Gaspard Hofman is conclusive in proving that while Cesalpinus was ending his long life in the serene atmosphere of the Vatican, the busy halls of Padua took little or no heed of the doctrine of the circulation which he had sketched so wonderfully. Born at Gotha in 1572, after studying at Strasbourg and Altdorf, Gaspard Hofman went to Padua in 1602, the self-same year that Harvey left it to return to England. The Nestor, Fabricius ab Aquapendente was still one of the chief personal glories of the Republic of Venice and of the University of Padua. Under him Hofman studied as Harvey and a generation of anatomists had done before him. Yet, when Hofman returned to Neuremberg, where he taught for forty years, he persistently opposed Harvey's doctrine, and was not even converted by the personal demonstrations with which he was honored by the illustrious Englishman. If the teaching of Cesalpinus had made way, if the doctrine of the circulation had been correctly taught in Padua after Harvey left it, and while Hofman studied there, would he not, learned and accomplished as he was, placed the fact on record?"

No, Harvey received all the obloquy which was heaped upon the new theory, and to him alone belongs all the honor.

The next name that we must mention in our chronicle is that of Fabricius ab Aquapendente, one of the best anatomists that the glorious old University of Padua ever had. Fabricius discovered the valves in the veins (1574), and thus

inserted the last round in the ladder of discovery, up which, in the fullness of time, Harvey walked to immortality.

William Harvey was born on the 1st of April, 1578, at Folkstone, in Kent. At nineteen years of age he graduated from Caius Gonvil College, Cambridge, and thus prepared, he enrolled himself as a student of medicine in the University of Padua, then the most famous seat of medical instruction in the world.

In 1602 Harvey returned to London and engaged in the practice of his profession. When only thirty-seven years of age he was chosen to deliver the lectures on anatomy and surgery at the College of Physicians, and in his first course of lectures (1616) taught the circulation of the blood nearly as we know it to-day.

For nine years longer Harvey continued to elaborate and prove his new theory before he gave it to the world in that remarkable treatise, "Exercitatio Anatomica de Motu Cordis et Sanguinis."

Remember that Harvey never saw the circulation, the necessity of which he demonstrated beyond a doubt. It required many years more for the microscope to reveal to Malpighi the wonderful secret of the capillary circulation; and a century and a half must pass before a Priestley unfolds the chemical composition of the air, and thus completes the story of the circulation.

Harvey was intimately associated with the Court of England, first as physician to James I., and subsequently as physician to the unfortunate Charles I., in which capacity we have already met him on the field of Edgehill.

We can not but feel that Harvey was fortunate in the age in which he lived. We have already seen how thoroughly the way had been prepared for his especial work. The discovery of the blood's circulation could not have been much longer delayed. He lived in an age of political, theological, and scientific excitement. He was a direct sufferer by one

of the fiercest struggles between throne and people that the world has ever seen. A Galileo was carrying the torch of regeneration into the dark domain of physics; Kepler was successfully interrogating the planets as to the laws that govern their movements; Cromwell, Shakspeare, Milton, Bacon, Robert Boyle, Dryden, and Ben. Jonson were numbered among his contemporaries.

When Harvey appeared, his mission was to apply, to grasp as a whole. The facts were already in the possession of his contemporaries, but it required the genius of a Harvey to mould them into a unit, to marshal this chaos of facts into the symmetry of a science.

But why detract from Harvey's glory on this account? Is not this the mission of nearly all discoverers? Let us look at the history of vaccination. The loiterer in the little church-yard at Yetminster, England, will there find a tombstone on which is written the following inscription: "Sacred to the memory of Benjamin Jesty, who departed this life on the 16th of April, 1816, aged seventy-nine years. He was born at Yetminster, in this county, and was an upright and honest man, particularly noticed for having been the first person (known) who introduced cow-pox by inoculation, and who, from great strength of mind, made an experiment from the cow on his wife and two sons in the year 1774." All honor to farmer Jesty! But does the recognition of Jesty's part detract in the least from the glory of Jenner, who, twenty-two years afterwards, without any knowledge of the experiment of his fellow countryman, crystalized into a life-saving principle the neglected gossip of the milkmaids of Sodbury and taught it to the world? This was the master-stroke of genius.

The question may arise in your minds, What was there left for Harvey to discover? I answer, in the language of Dr. Rolleston, Harveian orator for 1873, "Nothing less than *the circulation itself.* His predecessors had but impinged, and

that by guess-work, upon different segments of the circle, and then gone off at a tangent into outer darkness, whilst he worked, and proved, and demonstrated round its entire periphery."

Harvey's discovery was a true discovery in every sense of the word. He brought to his aid a large and exact knowledge of anatomy, both human and comparative—a mind thoroughly cultured—an earnestness of purpose and an industry which yield to no difficulties. His teaching was not a mere hypothesis, based upon an isolated fact or two, but was a demonstration complete and perfect as was possible with the then existing state of knowledge.

Harvey had sincere faith in the evidences of his senses; not reason or precedent, but *experiment* was the tribunal to which he constantly appealed, hence he made extensive use of vivisections.

"I propose to teach anatomy," he writes, "not from books, but from dissections." Like Descartes, who, when asked to show his library, took his visitor to an out-house, and pointing to the half dissected bodies of animals and birds, says: "There are my books—this is my library."

Harvey's essay on "The Motion of the Heart and Blood" is the epic poem of medicine. We have no time to enter into an analysis of its contents to-day, but I cordially commend to your careful attention this essay, one of the grandest specimens of inductive reasoning which the world has ever seen.

Fortunately we have an excellent translation of Harvey's works, by Robert Willis, made under the auspices of the Sydenham Society, 1847.

Harvey was particularly fortunate enough in living to see his doctrines universally accepted and taught, but it required twenty-five years to bring it about. We are told that no physician who was past forty-five years of age when the discovery was announced ever gave his adherence to it.

Gossiping John Aubrey tells us that after Harvey's book on circulation came out "he fell mightily in his practice; it was believed by the vulgar that he was crack-brained, and all of the physicians were against him." The same authority says "that although all of his profession would allow him to be an excellent anatomist, I never heard any that admired his therapeutic way. I know several practitioners in this town that would not have given three-pence for one of his bills (prescriptions), and that a man could not tell by his bills what he did aim at."

The years roll on, and we find this mighty philosopher, as full of years as he is full of honor and glory, as Sir George Ent found him, "Democritus-like, busy with the study of natural things, his countenance cheerful, his mind serene, embracing all within its sphere." Or, as Harvey writes of himself in one of his letters to Mardi, of Florence, "I, myself, though verging on my eightieth year, and sorely failing in bodily strength, nevertheless feel my mind still vigorous, so that I continue to give myself up with the greatest pleasure to studies of this kind."

William Harvey died on the 3d of June, 1657, in the eightieth year of his age; but the name of William Harvey will ever

> "Stand like a beacon, throwing light far out
> Over the rippling tides of centuries."

ART. V.—*Lectures on Insanity.* By DANIEL H. KITCHEN, M.D., Chief of Staff of the Hospitals on Blackwell's Island, New York. Delivered at Charity Hospital during October and November, 1876.

LECTURE I.

Without any preliminary remarks, we will proceed at once to the subject under discussion.

We well know the arduous and diverse duties of a student of medicine, confined, as they are, to within a very short

period of time. I will at once ease your minds by the declaration that, although I would impress upon you the great importance of the subject, I shall not necessarily magnify it, but confine our remarks to facts, and what I believe to be simple truths and principles.

Insanity as a name, not implying, either etymologically or otherwise, any thing to lead to a proper idea of this subject, gave rise in our own, as well as in foreign languages, to legions of synonyms, none of which, however, has improved our real knowledge, but rather led to confusion of a proper definition of the disease, wherefore insanity has had as many definitions as it had authors. The following, which is simple, and I believe most reliable, is one which will not easily lead you astray.

Insanity is a disease of the brain, affecting the mind, by which there is a change in the person's mode of acting, thinking, and doing things. This simple but comprehensive definition will lead you at once and safely over a large stumbling-block and Babylonian confusion—the great Mistura Diabolica—of our subject: I mean its classification. Persons sound in body, acting, thinking, and doing things during their path in life in sound coherence, with impressions correctly received by external influences through the nervous system, accompany their acting and doing things with a show of either depressed or exalted feeling, exactly in accordance with these true impressions so received, only modified in degree by their force of will. If these impressions and subsequent demonstrations of acting, thinking, and doing things have lasted for a specified time, or if they have been inordinate in force, a relaxation of powers of reception and reciprocate efferent action is the result, sound sleep, but which we may here call as well a physiological dementia. Let us look now at the other possible side. Suppose persons receive by existing influences, through their nervous system, impressions incorrectly, or that the

brain creates an impression, although no influences exist nor have been brought to bear upon their nerves, and either of these impressions constantly repeating themselves or continuing in action, so that the force of will over them ceases, although understood to be erroneous, the first result will be a depressed feeling or melancholia, which cause and effect constantly re-occurring or continuing, sorrow and depression give away to exaltation and mania. This frenzy gradually exhausting the life-force of the brain, its function as the recipient of impressions and center of reflex action and thinking ceases, and we come to the third and last stage, pathological sleep, or dementia. Now, as these three stages constitute a case of insanity, it is not to be understood that every case runs through these three stages. An insane person may either get well or die in the state of melancholia, or that of mania, or dementia. This being the case, we can assert that insanity, when running its full course, passes through the three stages, but also that it may be classified, so as to say that this or that case is one of melancholia or depression, or of mania or exaltation, or of dementia or mental weakness, and that the disease may terminate fatally or favorably in either. We would not scientifically say, this man died of mania, but of insanity, just as we would not fill up a death certificate of a man having died of pneumonia with, Cause of death, hepatization of the lungs. Aside from the three phases of insanity we have to consider a fourth, without associating it with the other three, as it neither has the same pathological progression and prognosis, nor can the same general treatment be permitted—I mean general progressive paralysis or paresis—a disease where the physical and psychical forces of man join hands, wasting steadily and gradually away, till the last cinder of their existence dies out, leaving but the wreck of a once active and reasoning man to the yawning grave.

Before going further, we will present a few remarks on the

history of insanity. It was known to the ancients, and we have medical records of cases from Hippocrates and Galen to the present time. In ancient times and the middle ages the general mass of the people were so infatuated with superstitious notions, that no scientific research, even when successful, could be brought to light. The poor insane were not only subjected to the most barbarous treatment, but often looked upon as evil spirits or sorcerers, and, after most inhuman tortures, burnt alive at the stake. Imagine a poor lunatic, who unfortunately conceives the idea that he is a prince, or that he owns this or that property, to be put to the rack and tortured to make him confess the contrary of what the very nature of his disease forces him to assert. But not only the ignorant populace and superstitious priesthood exercised this cruel treatment, but the more enlightened and even medical celebrities looked with fear upon an insane individual, and used all barbarous means conceivable to make the poor creatures act and do as they would, which these unfortunates were of course unable to do; and when all efforts of force proved of no avail, they chained them to the walls of prison cells, fed them like swine, till merciful God ended their tortures by death. Even Cullen treated his patients by forcible opposition and coercion. It was left to the great Pinel, not a hundred years since, to bring about a complete change in the aspect and treatment of insanity, which was so successfully followed up and elucidated by his successor, Esquirol. Since then insanity is in all civilized countries looked upon as a disease, like any other, and in nearly all institutions for the insane these poor, afflicted fellow-beings are now treated with the utmost consideration.

Arguing from the stand-point that insanity is a disease deserving the same consideration which we would give to any other, we will divide the causes, like those of other ailments, into—1st, Predisposing; 2d, Exciting. The old no-

tion, still adhered to by some writers, of arranging the causes into *physical and moral*, I consider unsound and untenable. A cause of a disease, whether of physical or moral character, will only be a cause for such as are susceptible of the development of it. If a man becomes insane by a sudden mental shock, say sudden loss of a parent, his brothers and sisters, however similarly afflicted, escaping, it shows that the susceptibility to insanity predisposed that man to the alienation of mind, while it did not affect his kindred. That man would undoubtedly have suffered similarly had he strained his mind by a continued effort to find the square root of a circle.

When we know that among barbarous nations the number of insane is comparatively much less than among the civilized, theoretical considerations that the climate, form of government and religion, the general occupation and habits which regulate the state of civilization, must more or less influence a feverish activity of life, and, therefore, of the brain, are certainly allowed. When we consider further, that among certain nations, whose multiform industries and constant eager aspirations for competition in all acts of modern civilization, insanity is most prevalent, we are forced to assume that when we cultivate passions and strain our minds for such objects it predisposes us more than others to brain diseases affecting the mind.

Taking this stand-point, the increase of insanity, as proven by records and statistics during the past twenty-five years, we have good reason to assume to be due to progressive mental strain, together with the inventions of so many unnecessary and unnatural auxiliaries for our luxury and debauch. Thus we pay our debt for progressive civilization.

In regard to frequency of occurrence the United States ranks first; then, in order, Ireland, France, Germany, England, etc.

That the ova of the female and the spermatazoa of the

male are the physiological fruit of living human beings, and that the proximate principles of which they are composed are derived from the blood of the respective individual, no physiologist will deny. Taking this as a basis, it has been argued that insanity is transferred from parent to child during conception. While I do not deny the influence a poor or abnormal state of the blood of the parent during conception may have on the offspring, I certainly will not admit the exaggerated theories of hereditary causes, some of which almost lead to a presumption that because the father was an idiot the son must be weak in mind. How many thousands have a consumptive father, and otherwise unhealthy mother, who go to all the funerals of their medical attendants! How many fathers have the brain of a Humboldt, and how many mothers the master mind of Queen Elizabeth, but their child in an asylum! How many instances have we where the parent's faculty for scientific researches or mechanical genius was prominent before marriage, during and after marriage, probably calculating for the chances of finding the next ultimate chemical principle, while his animal nature looked for legal descendants, and still you can not make of his son any thing but a hod-carrier or a dish-washer! How often is it that both father and mother are insane? Very seldom indeed. Why, then, is it to be presumed that when one of the parents is of unsound mind this one-half of the vito-chemical combination must be received with that strain upon it by the other half in the formation of the new being? *i. e.*, if in a bottle of sulphuric acid a few drops of nitric acid have been accidently mixed, will the nitric join hands with the sulphuric acid and make a new compound with a salt of lead? Certainly not while there is any sulphuric acid left. Nor will a vine from the Rhine produce good grapes on Blackwell's Island. It is true that statistics show that as many as thirty per cent. of those admitted in hospitals for the insane can conjure up among

their forefathers some one who showed a taint of lunacy, but how many per cent. of those dying of pneumonia, or apoplexy, or gastritis, or in parturition, can show among their fathers, mothers, sisters, brothers, aunts, uncles, first and second cousins, a whole squad having similarly been transferred? Let us, then, look upon *hereditary predisposition*, so called, not as a direct cause of insanity, but say that in man a diathesis for this or any other disease may exist, which, when brought in contact with or influenced by adequate existing outward influences, will more likely develop such disease in that person than if such a diathesis had not existed. In consanguineous marriages being a cause of imbecility or idiocy I do not believe. Not only the Scriptures, but present observations, indicate the soundness of this view. A distorted pelvis, unscientific use of the forceps, undue traction on the child when the diameters of the fœtal cranium do not correspond with those of the pelvis—in fact, any thing producing compression of the brain of the fœtus during parturition, and, particularly, when resulting in a distorted or unsymmetrical skull, must be taken to predispose the coming being to insanity.

On the subject of sex, statistics, observations, and opinions are so conflicting that we may safely assume that among a gross of insane persons six dozen are males and seventy-two females. The time when man is most exposed to exciting causes is naturally the one when the mind and body are fully developed, and thereby most active; whence it arises that the greatest percentage of patients brought to insane asylums ranges between the ages of twenty-five to forty-five. Before the age of puberty insanity occasionally but rarely occurs. Even so in the aged; and when occurring partakes more of the type of eccentricity and second childhood, or senile dementia, than of real morbid, mental alienation. Some periods of life offer more chance for exciting influences to take hold, and this holds good in insanity as well as in

other diseases, such as dentition, puberty, climacteric period, etc. Persons doing more head-work than hand-work are more liable to insanity and less likely to recover. Town and city life predisposes more than country life, probably on account of the former being more exposed to vice. For a similar reason more unmarried people are insane in proportion to their ratio of population; never married, forty-nine per cent.; widowed, eleven per cent.; total unmarried, sixty per cent.; married, forty per cent.

As a warning to parents, it may be stated here that harsh and neglectful treatment of a child, inducing him or her to seek seclusion, or too much leniency in the permission of reading light literature, particularly exciting and licentious novels, lead to a state of mind easily kindled to exaltation. Further, should either parent have any failing, moral or otherwise, especially non-control of the will, such must be carefully hidden from the view of the child. Want of a proper attention to prevent constant exposure of a parent's mental failings is often a far greater cause of an offspring's insanity than the so-styled hereditary taint.

Not enough caution can be prescribed to keep a person predisposed to insanity from any of the exciting causes; it is like keeping an electric spark from the predisposing chemical affinity of hydrogen and oxygen.

Intemperance is far the most frequent of the causes of insanity. Not only that intemperance is very often the direct and proximate cause, but its influence is also remote. I must urge you, gentlemen, to use your utmost efforts to stay this bane of society. Your influence as physicians on individuals directly is far greater than other professions, and you can, by constant efforts, not actually stay, but certainly, to a great extent, diminish the occurrence of this passion and vice. It is not only the frequent cause of insanity, but also the barrier to successful treatment of all other diseases. You will meet with it in all nationalities and governments,

the civilized as well as the barbarous; in all kinds of society, at court amid the aristocratic and rich, and among the lowly; it is the enemy of mankind, the destroyer of happiness, individual and domestic, co-partner of all crime, from misdemeanor to murder; it is the creator of debauchery, the father of poverty, and the chief working element of the devil. Men do not dare to defend it, yet it is tolerated in every social sphere, and I fully believe has caused more anxiety and disease than all the other causes combined. You can not arm yourself with a better weapon to combat disease than by studying the many excellent works on alcoholism. In insanity, intemperance is so universally acknowledged as a prominent cause that nothing remains for us to consider but the intensity of the effect of the various alcoholic stimulants upon the healthy condition of the brain. It has been distinctly noticed that in countries where no wine grows, and where distilled liquors are but sparingly used, but where beer, ale, and other malt liquors are the basis of luxurious beverages, a much smaller percentage of deleterious influences upon the brain has been noticed than in other localities. In other words, among all evils arising from the use of alcoholic stimulants, those from malt liquors are the least. Next come localities where wine is cultivated in sufficient quantities to preclude by their plenty and cheapness the frequent use of distilled liquors, and we may here note that natural wines are by far less hurtful than the artificial trash unfortunately so frequently used in this country. Of the two kinds of natural wines, it has been found that the *red* is not so inimical to health as the *white;* also, that the acid wines are less so than the heavy, sweet varieties. In countries where wines do not grow and are too expensive, also in cold climates, where malt liquors have by habit been banished with fearful rapidity through the use of distilled liquors, insanity caused by intemperance not only overshadows those localities previously mentioned, but the disease has

kept step in increase with the increase of intemperance. Distilled liquors and such as are manufactured from spirits obtain their alcoholic constituents generally from grain or beet-root. If these products are scarce, spirits are often distilled from cider, and M. Lunier says positively that alcohol from cider is more pernicious than that from beet-root or grain. Among all artificial stimulants absinthe is decidedly the worst, not only that when taken in the same dose and strength as other spirits it produces intoxication much quicker, but also that it has a very pernicious influence upon the nervous system. The order in strength of influence upon insanity would, therefore, be as follows: 1st, absinthe; 2d, brandy, gin, and whisky; 3d, fabricated wines and cordials; 4th, natural wines; 5th, malt liquors.

A jocular American, but habitual drinker, once stated to me, "I don't see how from your beer I kept sober, from Rhine wine I was tipsy, from Cognac I got drunk, and when I took absinthe I became crazy." Other stimulants, such as opium, Indian hemp, and other narcotics are also exciting causes of insanity. The use of the former is rapidly on the increase, and its use as a medicine to the insane, as useful as it may be, must be guarded, as patients often complain of sleeplessness, so as to obtain its effect, they having become, or have been before, habitual opium-eaters.

Although the relation which general sexual vice bears to insanity can not be accurately estimated, especially in insane prostitutes, there is no telling whether the cause was in the vice, or in concomitant intemperance, or remorse and unkindness, etc. One kind, masturbation, shows itself too plainly in hospitals for the insane, as not to count as but too frequent an exciting cause of the disease. We need only visit the wards of asylums where the demented are kept separately, and regard these unfortunate victims, who, although now reduced, in regard to ideo-reflex action, to the vitality of an oyster, still continue, by animal-like instinctive

habit, that vicious practice. By the following points you may easily recognize this state of circumstances: Patients are generally more or less imbecile and of shy habits, from fear, dread, and suspicion. We find a scared look, an irregular circulation; these patients are usually very irritable, and are influenced by painful delusions which are irritating and depressing; skin cool, particularly the hands, and covered with perspiration; have false ideas of a peculiar nature, which are suggestive of every thing insulting and outrageous.

A masturbator, when insane, construes every thing as vile, indecent, and wretched; he is often watonly mischievous; he sometimes commits acts of violence on some person whom by fancy he supposes may have committed a wrong; the look is very unsteady, and continued restlessness shows the nervous excitement under which he or she labors. Some cases have the above symptoms not so distinctly marked, but suspicion should always be excited when newly arrived patients soon search secluded corners in the ward, object to sleeping in a room with others, and avoid company generally. Some patients are so unrestrainable in their vice that in asylums where the camisole has quasi been abolished, it must be used as an exceptional measure, merely to keep their hands confined. It would probably be well to remark here that on account of the suicidal and homicidal propensities of the masturbating insane a special care should be exerted in watching over them.

We now come to epilepsy, which constitutes about six per cent. of the cause of insanity. It often begins during infancy, in peculiar kinds of convulsions, which are characterized by the suddenness of loss of consciousness, and often preceded by a spontaneous temporary nettle-like rash, which suddenly disappears before the outbreak of the convulsions. When infantile epilepsy is the cause of insanity, the latter does usually not show itself until after puberty.

Any injury to the head or spine which produces a pressure or a wound in the convolutions of the brain, abscesses, sanguineous or serous exudations, with apoplexy, paralysis, sun-stroke, and, in fact, almost any of the affections of the brain, particularly when caused by injury, form part of the cause of insanity.

Varieties of fever, particularly, however, the typhus, typhoid and inter-remittant fevers, are often producers of insanity, especially during the eruptive stage, when the rash either does not appear at all, or after appearance recedes suddenly. Various other acute and chronic affections sometimes precede insanity, and are often, and, probably, sometimes correctly, counted as among its causes. Since Hebra's minute investigations of skin diseases, more attention has been drawn to this subject, and particularly, lately, a most remarkable connection with, or intimate relation to, the nervous system has been noticed. Some have traced many varied functional nervous disturbances to follow a suppression of skin diseases, and as mental disorders have often disappeared upon reappearance of a rash or other eruption, it is worth the while to research this pathological chapter of the skin in its relations to insanity. As it is very often difficult to discern between cause and effect in uterine disease, their percentage as a cause can not well be given. But that suppressed menstruation, fluor-albus, displacement of the uterus, and other uterine ailments, often favor an outbreak of insanity there can be no doubt. In a large majority of these cases hysteric convulsions accompany the mental alienation. Beware, however, of imposition in regard to this cause practiced upon physicians by insane masturbators.

We have now finished that part of the exciting causes usually called physical, and approach the so-called moral causes. Authors upon insanity have a habit of expostulating, in detailed chapters, on every one of such causes. In my opinion, they are all alike in their effect, and, as their

names are legion, a very handsome 1,000 pp. 8vo. volume could be written upon that subject. Now, let us see whether we can not settle this question in a practical manner, without going into any family grievances, political excitements, religious ecstacies, and war troubles about it.

The brain is the locality and domicile of the highest functions of the nervous system, where all intellectual reflex actions center. If we overwork or strain the physical functions of that brain, be it by a sudden shock, by continued excitation, or by overtaxation of its physical ability, it will lose its balance, and through it all control over exito-motor actions. All moral causes act just that way upon the brain, and be their name whatever it may, they influence the brain, as stated above, by straining its physical function, and *that is all.*

Try if you can make any thing else out of the following most frequently discussed moral causes: Domestic trouble, domestic grief, reverses of fortune, religious anxiety and excitement, disappointed affections, fear, fright, intense study, political excitement, war, poverty, sudden joy, wounded feelings, ambition, jealousy, exalted self-love, high responsibilities, shattered hopes, and any number of etceteras you may wish to append.

The causes of general paralysis are, usually, only physical intemperance, high living and debauch; but on this subject we will discuss details under the proper chapter.

As the brain, like every other organ of the body, must retain its organization intact for a perfect execution of its functions, you will see how necessary it is to protect this supreme center of life from any accident, and because it, like every other organ, receives its proximate principles for the integral parts from the blood, any poisoning of the latter (alcohol, syphilis, etc.,) will pathologically change it, and thereby disturb its functions. Post-mortem examinations of the insane have demonstrated physical changes in the

brain. These changes are of a varied character, and of varied extent, they even are not visible in all cases except with the microscope. This latter circumstance must, however, not mislead us to an idea that no pathological changes have occurred. We know how delicate the structures of the nervous system are, and how much we have to fathom to get a correct understanding of the physical structure and chemical proximate principles of the brain in its physiological action, that we must concede, with Dr. Maudsley, in thinking that the subtlety of nature may exceed the subtlety of investigation.

Physiological research has demonstrated that the higher the intellectual functions the further towards the periphery of nerve centers do we find their work-shops. It is, therefore, not to be wondered at that in cases of purely mental, without motor disturbances, pathological lesions must be looked for and are found nearest the membranes covering the periphery of the brain. Of the most indefatigable and shrewdest observers of pathological changes peculiar to insanity is the celebrated Schrœder Vander Kolk, and he, after more than thirty years' experience, says: "I do not remember to have performed, during the last twenty-five years, the dissection of an insane person who did not afford a satisfactory explanation of the phenomena observed during life. On many occasions I was able accurately to foretell what we should find." In our own State we owe to Dr. John P. Gray a debt of gratitude for his scientific researches into the cause of insanity, he being the first in America to commence a correct system of pathological investigations.

But not only do we find pathological changes in the brain and its membranes, but also in other organs of the body. Griesinger and Brown-Sequard have demonstrated by beautiful and remarkable cases, where diseases of the respiratory organs or the alimentary canal, as well as of excretory organs, were the exciting causes of insanity, that the supreme

cerebral centers may suffer secondarily from some irritation in some other part of the body. Dr. Maudsley asks, but leaves unanswered, why the nerve centers should be so secondarily affected at one time and not at another? This we can answer by other questions. Why do some children having intestinal worms suffer from convulsions while others do not? Why does dentition produce, sometimes, derangement in the alimentary canal, and sometimes not? Simply because these organs were susceptible to disease, and needed only even a distant irritation to be roused to pathological changes. I can not see why some learned authors always forget that the brain is an organ, and if physically weak will become diseased by any exciting cause, if physiologically strong and healthy may withstand the severest shock.

As easy as it is to declare that the brain shows signs of morbid anatomy after death of the insane, as difficult is it, however, to link the character and locality of the pathological lesion with the stage and character of insanity.

Griesinger, Vander Kolk, Skae, Sankey, Gray, Kempster, and others have done much to clear the débris of general observation, but much labor must yet be used to establish, to a reasonable certainty, a certain locality of the brain with a specified and defined morbid change of the very many different ecstacies and depressions occurring in the insane.

Let us review, in a general way, the lesions of the different parts of the nervous system, reserving their special import when we argue the stages and their varieties.

1. *The membranes.* (*a.*) The dura mater has rarely been noticed to be affected; if so, it occurs in acute cases, and is thickened. (*b.*) The arachnoid is often opaque and milky; sometimes on the external surface granular. Hyperæmia, with effusions into the spaces, has also been alluded to by Griesinger. (*c.*) The pia mater is more frequently the seat of lesion than the other membranes. The pia mater is frequently found injected, and sometimes thickened and adher-

ent to the brain substance, while its two layers are separated and filled with exudations and debris. A thickening of the pia mater precludes nearly always a similar change in the arachnoid. Fibrous exudations and tuberculous deposits are also noticed. Of course in cases of hyperæmia we find the blood vessels injected.

2. The *epilhelial* layer is sometimes the seat of exudations and of crystalline deposits of phosphates.

3. The *blood vessels* of the grey matter being in proportion of five to one of the white cerebral substance, they become an important object for pathological observations; the importance of a proper blood supply to the gray matter is so obvious that the investigations of its vessels is a primary necessity. An occular inspection of the larger and smaller vessels to determine an engorgement or anæmia, should precede a microscopic examination, when, according to Dr. Bucknill, the following anomalous conditions may be found:

(*a.*) Hypertrophy of the muscular and (circular) fibrous coat of the arteries, undoubtedly due to overwork of the arteries—*ubi irritatio ibi fluxus.* A thickened condition of the sheath or hyaline membrane, with deposits in the sack it forms at the bifurcation of vessels, a very frequent occurrence, and associated with microscopic aneurisms, and sometimes emboli. Along with this, proliferation of nuclei, abnormities and deviations in the directions or normal course of arteries, have been noticed. Also, a pigmented appearance of the arterioles, and last, but not least, a dilitated condition of brain substance surrounding the vessels, probably due to exudation of lymph and waste matter, the latter having a toxic influence upon the cells.

4. The neuroglia, or cementing substance binding true nerve-matter together (Virchow), undergoes also the general pathological changes of hardening, atrophy, and degeneration. The hardening, generally called sclerosis, may be a general brain occurrence, or disseminated, resembling gray

degeneration, often found in brains of the chronic insane, or else *miliary*, a disease of the neuroglia of the white matter; and lastly, a colloid found in both white and gray matter. To these may be added *simple atrophy* of neuroglia, as found in extreme cases of senile insanity.

5. As in neuroglia, we also find degeneration in the cells proper, (*a*) either as a simple atrophy, (*b*) or pigmentary, granular or fuscous degeneration, (*c*) calcification, (*d*) hypertrophy. Aside from these, *fatty degenerations of nerve-matter generally*, may be alluded to and taken *cum grano*, it giving us no insight to any special mental alienation.

In regard to the *weight of the brain substance*, Dr. Sankey has made some interesting observations. He compared the weight of *cerebral substance* to that of the cerebellum and pons varolí. Normally this is 7.8 to 1; in acute insane cases, 6.49 to 1; in chronic, 5.77 to 1; in epileptic imbecility (five cases) and in dementia, 6.45 to 1; in general paresis (fifteen cases), 6 54 to 1.

General Prognosis or Termination of Insanity.—An old maxim that the earlier the stage when a disease is presented for treatment, the greater the chance for improvement and recovery, holds good also in insanity. Therefore, melancholia being the first stage, it offers the greatest hopes of recovery; mania already less so, and dementia may be set down as usually incurable. One undoubted truth exists, that the sooner the patient is brought to the hospital, the greater the probability of his or her recovery.

The question of percentage of cure of course arises, and is somewhat difficult to answer, because the statistics are taken from institutions, some of which receive into their wards old cases from alms-houses, prisons, etc., others more than their ratio of delirium tremens, while some take only recent cases. The following I think to be an honest statement of probable cures: When treated from the beginning of the disease, 70 per cent.; when taken to hospital after first and before four

months, 60 per cent.; when taken to hospital after three and before seven months, 50 per cent.; when taken to hospital after six months till one year, 20 per cent.; when taken to hospital after one year, 10 per cent.; chronic cases of mania without dementia, 5 per cent.; dementia, none.

Some phases of insanity may modify the above average, viz., when insanity begins before puberty, the chance of cure is small; when the temperature of the body rises several degrees, prognosis is unfavorable; indications of motor paralysis are an evil omen; complications with epilepsy almost sure death; puerperal insanity, and such as arises from disorders of the uterus, and hysterical insanity, give much hope for recovery; general paresis leads generally to the grave; slowly developed insanity is of less favorable prognosis than when of rapid order; the causes of intemperance and self-abuse are also unfavorable, and any mechanical injury to the brain, of course, also.

TRANSLATION.

Notes upon Salivary Calculus by Professor RICHET, Surgeon at the Hotel Dieu Hospital: with an appendix by Professor SIRUS PIVONDI, of Marseilles. Translated from the French by BARNARD ELLIS, M.D., Alumnus of the College of Physicians and Surgeons, New York.

GENTLEMEN: You have just seen, with me, a case of *stone under the tongue.* I use this term, though a little unscientific, so as not to prejudice the diagnosis, as I propose now to give you a complete history of those productions which are usually designated salivary calculi.

But first I must explain the case before us.

This patient was sent to me by my colleague, Dr. Frémy, whom this man, a merchant, had consulted some days before. He says this affection began in June, 1870, by a pain under

the tongue while eating, and being uneasy about it he tried to find out the cause, first with the tip of his tongue, then with the finger he distinctly felt a tumor on the floor of the mouth. A doctor who was called, prescribed a leech, applied locally, which brought some relief, but only for a few weeks; for in August he again felt the same pain, accompanied this time with a tumefaction of the sub-maxillary region, which was dissipated by the use only of discutients and cataplasms.

During the war he entirely forgot these phenomena, but in 1871 he again felt these pains come suddenly, and with a noticeable swelling of the sub-maxillary region. The acute symptoms soon disappeared, but the enlargement under the tongue remained. During the next four years the patient felt no sort of constraint nor pain. It is said, gentlemen, that pathological affections produce continuous symptoms. Notice, however, calculi, and among them the salvary calculi. The symptoms by which they reveal themselves are nearly always remittent, and the proposition, therefore, made in general terms includes an error. However that may be, after this long quiet, in 1875 the patient felt new pain and new difficulty in mastication. He then applied to Dr. Frémy, who sent him to me, and I at once recognized a stone under the tongue. The phenomena presented are, first, the constriction and pain. When he speaks he quickly feels a painful sensation under the tongue, especially in pronouncing certain words containing lingual consonants. He suffers, also, in eating. But remark, that this pain is not under the jaw, like that which indicates a retention of saliva, causing a distension of the sub-maxillary gland. This phenomena, which we see in many cases, is wanting in this one, and the pain and constriction which accompanies eating and speaking is seated under the tongue. They ought, then, to be related to a purely mechanical trouble in the functions of the tongue.

Besides, the pain spreads sometimes to the four inferior incisors and to the corresponding parts of the lip.

This symptom might make us suspect the abnormal development of a tooth, instead of there being a stone, as in the case of Stansky, which I shall recall to you, and which offers an example. You see it is not nothing; retain, nevertheless, the seat and the characters of this pain.

Physical examination shows in the left sub-lingual furrow a long tumor, extending from the symphysis of the chin to the most distant part of the buccal floor. It pushes the tongue upwards and to the right, and Wharton's duct is deviated out of place. It is covered with the mucous membrane, which is red and injected. Nothing can authorize, however, the assertion of Heller, a learned man, but not a surgeon, that this vascularization of the mucous membrane gave place at the time of the operation to abundant hemorrhages. The explanation of this manifest error should be found in some accidental complication which presents itself in a given case.

The tumor is hard, neither elastic nor fluctuating; the mucous membrane is attached directly upon it, without any interposition of liquid; we can assure ourselves of this by placing our finger on it in the mouth and another finger under it in the sub-hyoïdean region. Finally, in exploring the mucous membrane with a pin, we are soon arrested by an absolute, calcareous, strong resistance. What are the relations of this tumor with Wharton's duct? Placing the patient in a strong light, exploration with a very fine probe proved the existence of something in this canal. Scarcely had my probe entered when I felt a special sensation analogous to that in touching a vesical calculus, a sort of mucus friction, which you felt also. It is thus certain that our stone is in this duct.

What, now, is this concretion? A celebrated surgeon, in a theory to which I shall return, has assigned, as the origin of these stones, the production of calcareous deposits in the cavity of a ranula. But, you see, that the ranula is not

developed at the expense of the excretive duct of the submaxillary gland. It is not a cretaceous deposit in a ranula with which we have to do, but a tumor really developed in Wharton's canal, a real salivary calculus; unless, indeed, it may be produced outside the walls, and there is consecutive ulceration. But this hypothesis, unlikely *a priori*, is not justified by any fact.

But how is it that so large a tumor has not arrested the flow of saliva? When we see a simple inflammation of buccal mucous membrane, caused by aphthæ or thrushes, it is characterized by swelling of the gland. Here we are astonished to find nothing of the kind, and to see, after some former unexpected symptoms of retention, four years elapse without the least accumulation of saliva behind the calculus. Perhaps—but this is a simple hypothesis—the calculus is cunaliculated; perhaps—and I shall cite to you some examples of this kind—it presents upon the surface grooves or furrows which permit the saliva to flow.

Finally, gentlemen, I ought to explain the intervention necessitated by this affection. What shall we do to relieve the patient of his calculus, and so of his pain? Sir Astley Cooper, in a like case, divided Wharton's canal with a cataract needle as far as the calculus, and drew it out with forceps. Nothing is easier; but why encumber ourselves with a manual operation which serves no good purpose? Is it not simpler to cut directly down upon the calculus, and extract it by this large opening? I search in vain for the advantages of Sir Astley Cooper's procedure. It appears to me, on the contrary, to present the inconvenience of an incision of the canal much extended and more difficult of performance. The abnormal orifice exists in each case alike; and, moreover, what are the difficulties? It thus appears to me useless to complicate, at pleasure, a manual operation. I shall incise the mucous membrane over the calculus, following its long diameter, rock it in its place to loosen it, and withdraw

it with forceps; and this operation is so simple as not to need the use of chloroform or after treatment.

You have seen, gentlemen, how simple the operation is, and it has proved that the cavity was entirely free of liquid. The mucous membrane was thickened to nearly one-sixteenth of an inch, and you can comprehend how long a spontaneous ulceration would be in becoming established, and how difficult would be expulsion through such a fistula.

I was obliged to enlarge my incision, and, with a fluted sound, I rocked it, not without some pain, because it was very adherent. You see it is grooved, and these grooves were filled with the folds of mucous membrane, as we see calculi in the bladder sometimes fixed between the laminæ of that organ. After the operation there was no escape of liquid. Since then, a slight sore throat has developed, but without connection with the operation, and the orifice is already contracted. To assure my diagnosis, I have introduced Nos. 1 and 2 of Bowman's probes, found the pouch open, and no other calculus in it

What becomes of the wound? The observations upon this point are silent. The patients relieved of their calculus go away, are not followed up; but our patient will return from time to time, and we shall be able to see whether either the pouch or the canal becomes closed, or, on the contrary, whether a permanent fistulous tract remains.

Gentlemen, I have promised you to seize this occasion to trace the history of salivary calculi; to give the historical discoveries and the most important points upon this surgical question.

This compensating of our case appears to me to be much more useful than if the materials were abundant—if there were observations, memoirs, or theses to be found where I searched for the materials for this lecture.

The classical literature upon this subject gives, for the most part, but a much abridged description of salivary calculi.

The history of these productions is not new. Without going back as far as Hippocrates, we find in an Arab author, Avenzoar, cited by Dr. Clasmadene, some words worthy of remark: "I have seen," says this physician, "a man who had a stone under his tongue; it prevented him from speaking and eating; they removed it and he was cured."

Ambrose Paré, in 1556, related two interesting cases. The first case was of a Spaniard, who had a tumor in the throat. As he had difficulty in speaking and in masticating his food, this celebrated master explored the mouth and found a hardness under the tongue. Another time Paré was called by a doctor, Regent of the faculty, to see a certain Captain Augustin, a king's engineer, affected with a salivary calculus. As in the preceding case, he removed the stone and the patient recovered, but Paré added that after the operation one calculus remained, which they could not well detach. Later these cases multiply; the stones under the tongue were considered as "grenouillettes," or petrified ranulas, to use a term which was then classic. They believed that in giving this pathological explanation they had constituted an important progress in the knowledge of these stones. Notwithstanding in 1655, Wharton had discovered the canal which bears his name; from 1679 to 1682 Rivirius and Bartholin had described the sublingual glands and their ducts.

You may believe that these anatomical discoveries went far to throw new light upon the nature of stones under the tonge, yet nowhere were they called salivary calculi. Some authors, however, had a vague suspicion of the truth.

We find in a collection of the time in the library of Manget, in 1721, that Drelincurtius (modern, Drelincourt) having extracted a calculus, asked himself if it were not situated "in ductu salivæ," and he waited to support this opinion by a second case. J. L. Petit hesitated, and did not know whether he ought to believe in the petrifaction of ranulas; but soon, in a memoir which made an epoch in this litera-

ture, Lonis wrote a history of ranulas, and placing in error the seat of them in Wharton's duct, he drew no conclusions touching the production of salivary calculi. For whoever had wished to refer to the observations, the origin of these stones had since then been established. In fact, we find in a very complete thesis, in the inauguration of Christian Scherer in 1837, "Disputatio de calculis ex ductu salivali excretis," the following fact: A barber, shaving a customer, as was the custom, put his thumb in the customer's mouth, and ascertained thus fortuitously the existence of an induration, which was a salivary catculus, and which came out spontaneously some time afterward, and was followed by the expulsion of a second one.

But let us return to the memoir of Louis. It served to increase the obscurity which for more than a century reigned over the question, in spite of the thesis, nevertheless so clear, of Christian Scherer.

Thus, Sabatier, in publishing a curious memoir upon a calculus, in which Fourcroy found the principles of saliva, and which had caused retention of saliva, was under the influence of the ideas of Louis, as were also Boyer, Richerand, and Murgolin, and by a singular misunderstanding of the reality, they placed the ranula in Wharton's duct and the salivary calculi outside the salivary passages.

It was only in 1820 that the memoir of Fardean and Saumur finally opened definitely, the eyes of surgeons, and that they admitted the existence of Salivary Calculi in Wharton's duct, the same as in Steno's duct.

Soon, these cases multiplied themselves. Numbers of cases were presented to the Surgical Society, to the discussion of which we owe the light which was thrown on this subject.

In 1845 Duparcque published in the *Revue Medicale*, an interesting article upon this point.

In 1855 Closmadenc made it the subject of a thesis, under the presidency of Malgaigne. I cite also, the work of Du-

Morel in 1856, and the thesis of Cronzet over the sustaining of which I presided, in 1874.

The thesis of Closmadenc contains 112 cases, a number much less than we actually possess.

In 81 of these cases, he has mentioned the sex; 62 men and only 19 women. These Calculi affect men oftener than women, and are particularly an affection of adult age. We have not observed them before the twentieth nor after the sixtieth year.

To complete these etiological inquiries, we must ask what can be the direct cause of these concretions. The saliva contains normally but a very small proportion of mineral salts, and we should suppose that it was not at the expense of these that the concretions were formed. And yet this conclusion is erroneous, as I shall show presently. It is these salts which furnish the development of these calculi, but often a foreign body determines the situation and forms the nucleus of the concretion.

In fact these calculi are often found in the herbivora, and almost always in an elongated form, as in their center we find habitually a barb of oats or a like body.

In the case of an elephant who died at the menagerie in 1817, they found a grain of oats in the center of the calculus. In man it is sometimes the same.

In a case of Sequignol's a splinter of wood had determined the place of formation, of which it was the center, and the question was of a calculus in the duct of Steno.

'In Delery's case the man had eaten a trout, and the next day felt a constant, acute pain. Some time after they extracted a hard body—a sort of irregular pill—the center of which was a fish bone.

Here, as in the bladder, the smallest body surrounds itself with saline deposit. These bodies pass along with the liquids which fill the natural cavities of the body, a phenomenon so often observed in the waters of springs rich in

calcareous salts, where the objects placed therein become the nucleus of rapid petrifaction.

The chemical constitution proves still more their origin. Analysis of some of them has shown from sixty to sixty-five parts of calcareous phosphates, and from twenty-five to thirty parts carbonate of lime; and you know that these salts exist normally in the saliva.

Dr. Hardy ought to send me an exact analysis of a calculus in twenty-four hours.

Pathological Anatomy.—A complete study of the anatomical arrangement which salivary calculi present to our view, is contained in a curious case related by Closmadenc.

A man had died at Bicêtre in the service of Dr. Delasiauve, to whom Closmadenc was then intern.

This man had a tumor under the tongue which had been discovered during life. They raised the tumor, and having opened the salivary canal its whole length, they found encysted in a lateral dilation an oval-shaped calculus weighing forty-five grains. Upon the flattened sides they found two grooves—two canalicula running longitudinally—which had permitted the saliva to flow over the sides of the stone, and, thanks to this disposition, there was no retention of saliva. However, the gland was double its normal size; but behind the pouch which inclosed the calculus the canal was not dilated, but presented a normal caliber, and so to say in passing, this fact was quite sufficient to ruin the theory of Lonis, according to which the ranula was due to an accumulation of liquid in Wharton's duct. The pouch inclosed not one drop of liquid.

That which Closmadenc had found upon the cadaver, I have been able to show you by a real dissection made upon the living. The dilitation in which the calculus was situated inclosed no liquid, there was no salivary concretion, and, in short, we penetrated into this pouch containing the calculus by the natural orifice of the duct.

We thus see what has been said and done upon the subject of calculi in Wharton's duct; but does it exist in the gland itself? This case, which is very rare, has, however, been observed twice, and can not be doubted.

You can, among others, consult a case of Jobert's, who reports an example. Before I recall to you the principal features of this subject, I ought to say to you that these calculi are very often multiple. Sometimes they are placed one after the other in the canal, like beads on a string. In other cases they are agglomerated. Ribes has extracted ten from one canal, Drelincourt seven. Often they are seen two or three together, but never have they shown them to be in the gland. It was Jobert who, in taking out a calculus which had retreated, felt in the body of the sub-maxillary gland one of these concretions, which he extirpated above the hyoïdien region. Since then Dr. Terrier has presented an analogous case to the Surgical Society. Thus calculi may develop themselves in the salivary glands, though they may be less frequent than in the canal of Wharton, where they are usually seated at about three-eighths of an inch from the external orifice.

Finally, in a case without analogy, they have met in the gland a sort of lithiasis, that is to say, multiple concretions analogous to those which were observed in the uric diathesis.

These calculi are generally mammillated and irregular; and I have already said that they, sometimes, have cavities with two lateral trenches, which let the saliva run out. This disposition was supplied in our case by the deep sinuses which allowed the irregularities of the surface to sink in them, and which explains its adherence to the mucous membrane, and the absence of retention of saliva, it finding its way out in consequence of these irregularities.

The parotidean calculi, approach more nearly the spherical form, while those of Wharton's canal are olivary fusiform. Their weight and volume vary. The largest parotidean cal-

culus which had been observed, was extracted by Bassow, of Moscow, and weighed 270 grains; ours weighed 150 grains, and is the largest we have seen. It is one three-eighth inch long, and one five-sixteenth inches in circumference. Its color is greyish yellow; sometimes it is darker.

Dr. Maisonneuve has seen one of a red brick color. This calculus has become cracked, and, as you can see shows a pretty regular stratification. The concentric layers, of which it is composed, are formed one upon the other from a nucleus, at the side of which a point harder appears to be the origin of the formation.

As you see, it has no foreign body in the center; but permit me to found upon this point, an hypothesis, probable on some considerations. Dr. Maude, observed, a long time since, that the chemical composition of the tartar which encrusts the teeth was identical with that of salivary calculi.

Is there not here an indication which will allow us to believe that a fragment of this tartar accidentally introduced into the duct of Wharton, might give birth to the formation of a salivary calculus? And in support of this idea, I ask you to observe that these calculi are found oftenest in those who care little about the cleanliness of their teeth. and I will add that these calculi, are more frequent in the canal of Wharton so much nearer to the dental vault than the canal of Steno.

This narrative, gentlemen, would serve for a point of departure, in a research which might not be without interest.

I add, in terminating the pathologico-anatomical discussion, that a little fragment of this calculus was sent to Dr. Hardy, chief of the chemical laboratory, and contrary to our anticipation, and contrary to the fact most generally observed, the analysis showed that it was composed exclusively of carbonate of lime. This fact will be ultimately cleared up.

Symptomatalogy.—The example which you have under con-

sideration, gentlemen, shows you that the patients themselves often perceive the presence of these calculi only when they have attained considerable size.

Our patient, in fact, discovered in 1870 a tumor, the size of an olive, and the same fact appears in most cases. This is because the accretion is slow, and it is some time before it becomes a cause of appreciable trouble. These are felt in the region of the tongue, or of the salivary gland.

It is particularly these last phenomena which attract the attention of the patients. They have been described by Dr. Dujardin, who was afflicted himself with a salivary calculus.

Most of the patients feel a pain in eating, at the angle of the jaw, and this is because mastication stimulates abunddant afflux of saliva, and the excretion being restrained, accumulates, distends the gland and its ducts, and provokes a lively sensibility. Sometimes the patients relieve themselves by pressing on the sub-maxillary region, and so, evacuating the liquid by a jet, are relieved.

This occlusion and pain, in some cases, are reproduced at all meals; in others they appear irregularly. Meanwhile, under the influence of this repeated distension, the sub-maxillary gland becomes tumefied, congested, and the region becomes hot and somewhat inflamed. They consult a physician who recognizes the sub-maxillary inflammation, for which the patient has no difficulty in finding some common place cause.

Some therapeutical means are directed against the secondary symptom, of which we overlook the cause. Suspect, gentlemen, salivary calculi when you find a painful engorgement of the sub-maxillary gland.

Dr. Hirard, of this hospital, recounted to me a case of one of his nieces, who was attacked after a meal. It was a calculus. A classical case of Dr. Roberts's shows that a hog's bristle, accidentally introduced into Wharton's duct by a

shoemaker, became the source of inflammatory accidents in the gland, the cause being for sometime unknown.

Finally, my colleague, Dr. Maissenet, attended a young novice at the Hotel Dieu Nunnery, who had a swelling at the sub-maxillary region. He believed it to be a scrofulous engorgement of the ganglions. The next morning the patient told him she had spit out a tooth; but it was a salivary calculus, which had been spontaneously expelled.

When these symptoms have continued for a considerable time, they sometimes are followed by a real inflammation. An abscess forms and opens spontaneously; oftenest under the tongue; sometimes in the sub-maxillary region; and the orifice of the canal is converted into a permanent fistulous opening, by the presence of the foreign body. But sometimes we see the canal a long time dilating itself; it then appearing whitish and hard, sonorous to the touch of the probe, and finally, all at once, the walls of the canal sufficiently distended, open themselves and let the calculus fall out; for this whitish body was a calculus, spontaneous delivery. Such is the progress and termination, in some sort normal of the evolution of salivary calculi, as it has been described by a physician whom I cited to you as having experienced a cure in his own person. Sometimes when fistulas are produced they serve for a passage by which the calculus is expelled, but these cases are rare. But oftenest the fistulous tract conducts the probe to a body which is hard and sonorous; this is the calculus. The diagnosis is made; but if left "in situ" it almost invariably remains fixed, being held by the adherence of the mucous membrane, and the arrangement of the orifice is not favorable to spontaneous expression.

Finally, in certain cases, as we have seen, the calculus permits the flow of saliva; if there have been accidents in the region of the gland they become harmless, and it is solely by its volume, which interferes with mastication and the

production of sound, that the concretion attracts the attention of the patient.

Diagnosis.—Absolute diagnosis in these cases is, nevertheless, not always easy, I have said to you that inflammatory phenomena in the region of the gland, and which ought to be our guide, sometimes are due to other causes. Moreover, the proof of the presence of a calculus may present serious difficulties.

In a case, of which Dr. Hervetz, of Chégoin, has given me the history, to an enormous swelling of the neck was joined such a constriction of the jaws that the patient could open them only a few lines. In such circumstances only an approximate diagnosis can be made, and the doctor can only be guided by such antecedent history as would allow a presumption of the existence of an obstacle to the flow of saliva. When, on the contrary, the patient can open the mouth, and a rational examination of the functional troubles causes us to suppose the presence of a salivary calculus, we have only to put our finger on the tongue to feel a tumor absolutely hard, at the floor of the mouth. To be more sure, we have only to probe the canal, which act, however delicate it may be, is always possible provided that we examine the patient as you have seen me do, in a sufficient light, opposite a window, for example, and that we employ a very small probe, say one of Bowman's probes, or such as belong to Annel's syringe.

At from five-eighths inch to one and one-eight inches the stony feel of the calculus will confirm the diagnosis. If probing is impossible, which ought to be rare, but which it is necessary to foresee, we can accomplish the same end by running a needle perpendicularly through the tumor, as you have seen me do, the needle finding the calculus almost as quickly as the probe, and this practice is without inconvenience.

The differential diagnosis is more difficult. We must in-

deed distinguish the salivary calculus, first, from those acute and chronic swellings of the submaxilliary gland which are the product of other causes; second, from those cysts which form in the neighborhood of Wharton's duct, and are called ranulas; third, from various tumors which we find on the floor of the mouth, from real stones under the tongue, and from teeth which have deviated or made error of way, of which the case of Stansky has shown us an example.

In the first place, doctors of large experience have been deceived by a swelling of the submaxilliary gland. Thus, in 1852, at the Biological Society, Rayer reported the history of a doctor (the second one so far as we know who has had a salivary calculus, but whose initials only are given) who had for several years treated himself for a periodical swelling of this gland, without doubting its character.

Rayer, on examination, believed he saw something whitish across the dilated canal of Wharton, and which proved to be a salivary calculus. It was expelled spontaneously.

Jobert, in an analagous case hesitated. His patient was taken in 1850 with very grave symptoms, of which he could not determine the cause, when the expulsion of a salivary calculus caused the symptoms to cease. The patient returned in 1852 with a noticeable swelling of the gland. Jobert suspected the existence of a new calculus, but as the probe discovered none, and the symptoms persisted, he undertook the extirpation of the submaxilliary gland. But during the operation he perceived the existence of a calculus, deeply seated in the tissues of the gland. Notwithstanding a hemorrhage which took place during the following night, the patient recovered, but in 1857 he returned again with a third attack. This time the calculus was situated in the deepest part of Wharton's canal.

Recently, besides, Dr. Duplay saw a case analogous. A patient came first to him in 1869, with grave symptoms in the region of the gland, caused by a calculus under the

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tongue, and which he extracted; but in 1874 the same patient returned, with a noticeable swelling of the gland, but without any appreciable tumor in the floor of the mouth. An incision of the engorged gland permitted the escape of a new calculus, which was the cause of these symptoms. And notice carefully, gentlemen, that in these cases there is no question of calculi inadvertently left in situ at the first operation. Each time the tract had been carefully explored and found free. There is then something like a lithic diathesis, due to that dental tartar which appears to me to be the point of development of secondary salivary calculi. In fact, after the first operation the pocket where the calculus rested remains for a long time open, and accessible to foreign bodies in the mouth, we comprehend that the debris of this tartar can introduce itself in that way into the salivary ducts.

Finally, gentlemen, Dr. Terrier presented, some months since, to the Surgical Society a calculus found in this gland, and which he had extirpated. Although a calculus or a fragment of a calculus had been extracted by the mouth some months before, still the enormous swelling of the gland, as in the cases of Jobert and of Duplay, had imposed itself upon the mind as a degeneration of this organ. The other half of this calculus, as I have told you, was found after the extirpation of the gland. The patient recovered.

You ought therefore to comprehend that the diagnosis of certain calculi, complicated with symptomatic or idiopathic inflammation of the sub-maxillary gland, may sometimes be surrounded with great obscurity. Dr. Chassaignac, for instance, had diagnosticated an inflammation of the sub-maxillary gland; a few days afterwards a slip of straw was expelled from Wharton's duct. The case you will find reported at length in the bulletins of the Surgical Society. I also recall to you the fact that a hog's bristle had caused the

symptoms, of which the nature was unknown, in the patient of Robert.

Sometimes, also, inflammation may set up in the gland without there being any foreign body in the canal, examples of which we find in the thesis of Mr. Crouzet (1874).

Guided by these histories and by the remittent form of the symptoms, the surgeon will try to feel the calculus by direct probing through the canal or indirectly by the pin; but if these means can not be employed, or give a negative result, we had better rest in doubt than to make an erroneous diagnosis.

Thus may be explained the many cases of unrecognized calculi that we meet in science.

Secondly, the symptoms which accompany salivary calculi may confound this affection with ranula. This statement demands some explanation. What is a grenouillete (ranula)? Laying aside the ancient prejudices which saw in this sort of tumor only one variety of serous cysts under the tongue, Lonis, in the eighteenth century, professed that the ranula was due to the accumulation of saliva in Wharton's canal. This opinion, which was afterwards rejected, and the doctrine admitted that the ranula was developed at the expense of the sub-maxillary gland, was founded only upon rare cases. Thus, Jarjavay observed a case seemingly like this, and of which M. Forget made an interesting report to the Surgical Society. I have, myself, seen an authentic case of a salivary ranula in the dilated canal of Wharton, and you will find it published in the same report, but still, at one time, it was only a question of exceptions.

The question being clearly between sublingual cysts, independent of Wharton's duct, that is to say, ranulas, properly speaking, and salivary calculus is soon resolved. In general the calculus forms a hard tumor; the saliva does not accumulate behind it. Nevertheless the fact has been observed by Dr. Duprés at the Hospital Cochin, and he published the case

in September, 1872, in the *Gazette des Hopitaux*. But in these isolated cases themselves, you understand, the probe cuts the question short by discovering the calculus, if it exists, by contact of the sound, or by showing that the canal is free from any tumor if it is a ranula.

But you know that for a long time we have considered stones under the tongue as petrified ranulas. What truth is there in this supposition? Are there well-proved petrifactions of sub-lingual cysts? We may suppose it by analogy, although we are in want of well-observed cases of the kind. It is certain that we have seen calcifications of serous cysts, and here is an example: A few days since I brought Mr. Dussaussay, my intern, to assist me to extirpate a cyst in the mastoidean region in a young and very handsome woman. After having made the incision in the skin, posterior to the tumor, so as to leave the cicatrice as little apparent as possible, my bistoury encountered a hard body which notched the blade. Through this incision I then expelled stony concretions, which were composed of phosphate of lime. I here had to do with the calcification of a serosanguineous cyst.

It would be the same with a true ranula, subjected to the same modification. When I filled the place of Professor Croquet, at the Clinical Hospital, a patient came to be relieved of a very hard sub-lingual cyst which prevented his speech. I incised the mucous membrane over the tumor, intending to perform Jobert's operation of again bringing together the lips of the wound, when we were astonished to see a round, hard body jump from the wound and rebound upon the table. Astonished at first by an incident so unlooked for, and by the repeated and strange boundings which this foreign body made, and which had enucleated itself so abruptly, I seized it, and was able to prove it to be a hydated cyst, invaded at several points by calcification, and that the instantaneous contraction of the sub-hyoidean muscles

had ejected the body as soon as the incision was made. Dr. Robin, who made a careful examination of the calculus, confirmed my opinion, finding in its center the characteristic laminæ. It must, therefore, be admitted that certain cysts in the floor of the mouth may become incrusted with calcareous salts; and perhaps the ranula may itself suffer this transformation, though we are not in possession of any examples—at least, we are not willing to count as such three cases of petrified ranulas which have been transmitted to us by the surgeons of the sixteenth century, who were not well instructed, and who were not aware of the difficulties of the question.

Third. Can the salivary calculi be confounded with the other tumors in the floor of the mouth?

I recall to you here, gentlemen, the interesting case of Stansky. This physician was consulted by a young girl who, without having felt any pain, or remarked any symptoms in the region of the submaxillary gland, had noticed the development of a hard tumor under the tongue. Wharton's canal was not probed, but by an incision Stansky discovered a hard tumor, situated between the jaw and the canal, and which contained two teeth. The case was interesting, but the doctor who had observed it was wrong in the deduction that all salivary calculi had for cause an abnormal development of teeth. It was a grave error.

In the case of Stansky, it was not a question of calculus, but of an anomaly; of a deviation of a dental follicle; in a word, of dentition in an isolated place. The diagnosis should not be obscured by analogous facts, because it is a rule to be generally observed that we ought not to allow ourselves to be stopped by these isolated cases, these curious and rare anomalies, when there is doubt; and besides, do you not see that the probe will quickly indicate the nature of the affection, and that Stansky would not have made a barren hypothesis, if we had used it.

Prognosis.—I have but little to say to you upon the prognosis of salivary calculi. In general, it is the prognosis of an annoying affection, but benign and amenable to treatment easily made. Nevertheless, we see from time to time more serious symptoms, and which menace danger.

Dr. Hervez, of Chégoin, sometimes feared for the life of his patient; Jobert also manifested the same alarm in his case. Finally, in the case of parotid calculus observed by Fardeun, of Saumur, the inflammatory swelling of the cheek necessitated repeated, deep incisions, which arrested the progress of the symptoms.

Treatment.—Salivary calculi are surrounded, as we have seen, by accidents more or less grave, and which may demand special treatment. When, then, the calculus, by its presence, has caused sub-maxillary swelling and constriction of the jaws, what must we do? You must follow my plan in a case reported by Dr. Forget in his report of Jobert's case. A young man, of twenty-seven or twenty-eight years, had had a very noticeable sub-maxillary tumor for some days. He was anxious, and had extreme dyspnœa. The question of tracheotomy was discussed, so imminent seemed the danger, but I decided to incise the tumor freely under the jaw, when there run out an ill-colored liquid; and when I had enlarged the incision with a fluted sound, a remarkable quantity of viscid saliva escaped also. I had opened the gland where the saliva had accumulated, because of a constriction of Wharton's duct, consecutive to a chancre.

This patient died some years afterwards of syphilitic meningitis, for which he was treated by Doctors Bouilland and Ricord.

Thus all the therapeutical indications are to prevent suffocation by incisions deep enough to reach the gland itself.

As for the rest of the treatment, after having already discussed the question of the therapeutics in the case of our patient, and given my reasons for preferring to extirpate by

a direct incision of the mucous membrane over the tumor, I need not add more. You must know, however, that the calculus sometimes steals away, so to speak, and appears to disappear in the depths of the sac, where it is difficult to seize it. In an analogous case Dr. Maisonneuve overcame this difficulty easily by passing a silver thread behind the calculus, and so drawing it out. Sometimes, on the contrary, the calculus is in a manner bound in by a sort of hour-glass constriction, and it is then necessary to gently rock it with the fluted sound, pushed under it. Finally, if there are fistulas, we may use them for getting at the calculus, and withdrawing it after having loosened it in its place.

After these operations the patients recover.

Is there a salivary fistula? It matters little to them, but to satisfy a legitimate curiosity we shall endeavor to elucidate this unknown point by an attentive and prolonged observation of our work. It remains yet subject to relapses of which science offers several examples, and these relapses may, perhaps, be evaded by a very simple prophylactic treatment. In this study I have arrived at the hypothesis that the production of salivary calculi is not without relation to the deposit of tartar upon the teeth of persons who are habitually careless of their person, and it is perhaps in the hygiene of the mouth that we are to find the means of preventing either the formation or the "morbus recidivus" of salivary calculi.

[Since the publication of the foregoing clinique, Dr. Sirus Pirondi, Professor in the School of Medicine at Marseilles, has sent an answer to the question of Professor Richet, "What is the result of the wound in the operation of incising the mucous membrane for the extirpation of salivary calculi?" and which is here appended.—TRANSLATOR.]

In his letter to Professor Richet he says: "Circumstances having favored me twice in this relation, I felt that I ought to give them to you."

CASE I.—"In 1869 a man, aged thirty-six, came to the

'Hotel Dieu' to consult our lamented colleague, Dr. Broquier. He said an abscess had burst spontaneously in his mouth at the left lower jaw, about three weeks before, and since then incessant running of purulent saliva, impediment in speaking, and particularly in mastication, swelling, etc. Broquier's diagnosis was salivary calculus. He enlarged the opening and took out, without very much difficulty, a stone the size of an almond. The orifice of Wharton's duct was intact, and communicated with the bed of the calculus. After some days the wound was completely cicatrized, the canal remained permeable, and the place, which I saw often afterwards, showed no signs either of the operation or of the accident which had caused it."

Case II.—"In 1871 I was called to see a sea captain afflicted with a salivary calculus. Finding the mucous membrane perfectly glued to the calculus, and the orifice of the canal intact, although slightly dilated, I was not willing to touch the orifice, but cut directly upon the calculus (antero-posterior diameter), and using a small, inflexible spatula, I easily enucleated a stone of great size, weighing a little over one hundred and twenty grains, oblong, one and a half inches in length, and a circumference in the middle of seven-eighths of an inch. It presented on its sloping surface a canaliculus deep and covered, and nearly a quarter of an inch long. The wound cicatrized promptly, and without other care than frequent washings. It has left no trace, and in the frequent voyages of this captain to Marsailles, I have easily satisfied myself that the functions of this part of his mouth *are intact.* Here, then, are two examples of salivary calculus without abnormal consequences—such, for example, as obliteration of Wharton's canal—and without return of the calculus."

[The editor of *La France Medicale* adds to this that Professor Richet had, on the 20th January (1876), reported to him that the patient operated on by him (the Professor) in December, had a large fistula at the place of incision not yet healed.—The Translator.]

CORRESPONDENCE.

VIENNA LETTER.

VIENNA, December, 1876.

DEAR DOCTOR: The medical world of Vienna have their internal strifes and commotions, as well as their less illustrious brethren in the lesser spheres of this mundane orb. Even now the clashing of arms and the voices of the dusky warriors are heard from afar, and discord is reigning supreme. The war-cry has gone forth, and "victory or death" seems to be the watchword. The cause of all this "racket" is the Polyclinic. This institution is a free dispensary, with very large patronage, and numbers among its large staff several university professors and privat-docenten. It is mainly supported by the municipality of Vienna. Many university students attend instructions at this place. It has now been discovered by some physicians that this institution is run only for the purpose of self-aggrandizement by the leaders of the concern, that it is a means of spreading contagious diseases, and so on. It is also claimed to be detrimental to the general interests of the profession, many patients going there who are able to pay for medical advice, and that it is entirely useless, as all physicians here are perfectly willing to prescribe for the poor gratis. The very name even is assailed. The opposers say that "polyclinic" can be applied only to an institution containing beds, and as this one can not boast them, it should be called a street ambulance. They of the Polyclinic have requested an investigation from the board of health as regards its spreading contagious diseases, and hold forth its great popularity among the poor, and the large number of students attending for purposes of instruction, as a proof of its necessity. Much printer's ink has

already been spilt in the battle, and it is not yet closed; but the above are the main arguments pro and con. To an impartial observer the Polyclinicans, as they are termed, seem to be conducting the battle the more honorably, whereas, the opponents, using every means possible, seem to be actuated rather by motives of jealousy than those of benefiting any body but themselves. The opponents have been successful in so far that the city council have cut off financial aid, but this will not cause the death of the Polyclinic, it being proposed to raise a sufficient sum for its maintenance among charitable citizens.

A very pleasing little incident occurred at Pesth a few days ago, and one must wish that it would only find frequent repetition in our own country. A certain Mathè, having prefixed the title *Doctor* to his name in advertising, was summoned before the court to show by what right he styled himself doctor. He appeared and showed a certificate from the well-known firm, Buchanan & Co., Philadelphia, which not only made him a doctor of medicine, chemistry, and philosophy, but also stated that he had delivered one or more courses of lectures at their institution. In view of the fact that no such institution existed, and that the delinquent had never been away from Europe, the judge not only fined him, but also reserved the diploma, probably as a relic of what customs could exist in America in the year of our Lord 1876.

Medical journals are not so abundant here as in the States—in fact no kind of journalism flourishes here as in the land of newspapers—but what is lost in numbers here is made up in quality.

I must apologize for not having given a description of the medical notables, as per promise, as these matters led me off. I will make up at some other time.

Respectfully,

Dr. A. M. B.

EDITORIAL.

We were very much interested in some remarks that appeared a short time ago in the Medical Record on the endowment of medical schools. If this is a thing to be desired in New York and Philadelphia, much more is it in other parts of the country. Every where our medical colleges, multiplied beyond necessity, without government patronage or private munificence, are compelled more or less in the struggle for existence to debase still farther instead of elevating the standard of medical education. And, astonishing as is the fact, the public, who are vitally interested in this matter, seem totally indifferent to a state of things which touches them very nearly in their own persons and that of their friends. Perhaps many reasons might be assigned for this indifference, and one of these, no doubt, is our reticence as a profession, and our somewhat exaggerated notions of etiquette. If any other profession wants the public to know any thing about its work or its needs it resorts to the daily press, and why should not we? We occupy a position as honorable as any, yea, if we spoke the very thoughts of our heart, we should say more honorable than any. Our daily business is among the people, with whom our relations are of the closest and most important kind. The public can not do without us, and we have been trying too long to do without them, in some respects. Medical education at forty or fifty dollars a term, unless the classes be very large, which is more or less of a disadvantage, does not afford means for the appliances of teaching, or the remuneration of teachers, which, if not absolutely necessary, is highly desirable. Now, if Princeton, or Yale, or Harvard, want money for educational purposes they appeal to the public, and, to the honor of our people be it said, they never appeal in vain. Why should not the medical colleges do the same? What is there to be ashamed of, if we are honestly and earnestly engaged in fitting men for this most arduous as well as noblest of callings? We are doing more for the public than they can ever do for us. The burden of obligation is all on their side, and their attention should be drawn to the fact that neither in their individual nor corporate capacity has the medical body ever been properly appreciated or rewarded, as a rule at least.

We have no objection to seeing our rich patients found scholarships in literary colleges, endow libraries or professorships in the same, build churches, or subscribe to museums and art galleries. For all these things we have the highest appreciation. But why do such acts of munificence so seldom gladden our medical colleges? Is it because out of our absurd

reticence, we keep silence, and our wants remain unknown? If so, let it be so no longer. Let us say to the rich man, who, perhaps, only needs a hint to lead him to act, we ask you by the pains it has relieved or averted, by the dear lives it has saved, by the strongest and most binding ties of obligation, to turn your wealth into a perpetual blessing by conferring some of it on our profession. Perhaps we can hardly hope that, as a whole, many of our medical colleges will be endowed, but some of the chairs certainly ought to be.

For the sake of perspicuity, we may divide the professorships in a medical college into two classes, practical and strictly scientific.

The incumbents of the practical chairs, such as Practice of Medicine, Surgery, Obstetrics, etc., find an indirect remuneration in the added reputation and practice which their position brings, and their daily employment constantly trains and fits them for teaching. But with some of the professorships it is rather different. Their possession does not, in the estimation of the public, specially indorse the medical ability of the incumbent. For their proper cultivation much time, special apparatus, etc., is needed, and practice is rather a hindrance than a help to their prosecution. These remarks apply more or less to such chairs as Physiology and Pathology, which ought to be endowed in every medical college, especially in the smaller ones, so that young men of ability and ambition may seek them. And if provided with the proper appliances, and affording a sufficient income, such professorships in our small colleges are favorable for systematic, life-long study, and from them we might hope to receive constant returns of valuable knowledge. It has been so in Europe; it would be so here. We need endowments for our medical colleges, for professorships, museums, libraries, laboratories, etc. Let us, publicly and privately, make this want known; for one thing seems clear, we must ask if we would receive.

REVIEWS.

The Practitioner's Handbook of Treatment; or, Principles of Therapeutics. By J. MILNER FOTHERGILL, M.D. Philadelphia: Henry C. Lea. 1877.

This is a good book, but it might be a good deal better. Its plan is original, being, to bring physiology, pathology, and therapeutics in direct relation to the various forms of disease, and point out, not special medicines, but the general principles of treatment applicable to each. In following out this plan the author has presented us with a very interest-

ing book, but it would be a great deal better if it were more condensed, for there is an endless repetition of all sorts of things, especially the iteration and magnifying of a few commonplace physiological comparisons, which gets to be very tedious at last. Part of this repetition is no doubt the inevitable result of the peculiar plan of the work, but part also of carelessness in its composition, a carelessness which extends to certain crudities and inelegancies of style obvious throughout. To illustrate our meaning, let us give a few examples. For instance, on page 534 we read: "But at the same time they must take the potential consequences." Now this high-sounding phrase means they must take the consequences, which is logical and sensible enough, while the addition of the useless word "potential" comes very near to making nonsense of it. On page 539 we have (italics ours): "If, however, beef-tea be given with sago, or perhaps even better still, with arrowroot, which *goes thin* on boiling, and so *drinks clean*," etc. This introduction of the cook's technology is as unnecessary as inelegant, and has nothing at all to recommend it, being, indeed, simply a form of slang. On page 545 we find this short sentence: "In atonic gout it also is useful," when plainly enough the author meant "In atonic gout it is also useful"—an entirely different statement. On page 557 we are told that "For the young man to whom such experience is impossible, its advantages can only be *supposited* by painstaking observation," etc. Why not say compensated for, which is good English, while supposited is not, and suggests unpleasant associations to the medical mind. But enough. We could fill a page with just such examples, and we are very sorry for it, because the book is really too good to be so marred. We notice, also, more typographical errors than we ever remember to have seen before in one of Henry C. Lea's books. We hope soon to see a new edition of this book, "much improved," but not enlarged.

The Tonic Treatment of Syphilis. By E. L. Keyes, A.M., M.D. New York: Appleton & Co. 1877.

This little study of Dr. Keyes is a very valuable and suggestive addition to our current medical literature. Mercury is the *tonic* our author recommends for syphilis, and he undertakes the proof of its being a tonic, in small doses, by proving that it increases the number of red corpuscles in the blood. This is a very satisfactory thing to know, but a captious critic would be tempted to find fault with the logic of the conclusions. Is all that we mean by tonic included in the fact of a medicine increasing the number of the red corpuscles? And whatever its tonic properties may be, are we sure that it is by virtue of them alone that mercury does good in syphilis?

Dr. Keyes is of a warm and gushing temperament. Witness the following: "No means in the physician's hands place him so near the Deity as the iodide of potassium. With it, in well-selected syphilitic cases, he can sometimes almost effect a resurrection," etc.

This is very fine! What becomes of Cicero's often-quoted passage on the godlike attributes of the physician, compared with this, which unites all the grandeur of the old Roman with the scientific precision of modern time. But for all the liberties we have taken with his style, we like Dr. Keyes' book, and thank him for having written it, and recommend every physician—especially every young physician—to buy and read it.

An Elementary Treatise on Diseases of the Skin, for the use of Students and Practitioners. By Henry G. Piffard, A.M., M.D. London and New York: McMillan & Co. 1876.

This is a beautiful book in paper, print, and illustration, and a credit to American medical authorship. The introductory chapters are exceptionally full and good, and we are therefore sorry to notice a few such crudities as the following, in describing the sebaceous glands, on page 15:

"These glands are as universally, but not so numerously, distributed as *the ones* just described."

Pray, why not have said "as those just described?" What in the world are relative pronouns good for if dermatologists may not use them as well as other people?

Dr. Piffard is a most thorough-going humoralist, and is as diathetical as heart can wish. This is well enough, but it has struck us that he is too sure about some things. Oh, that we could have some of this *assurance* of faith! But, whatever we may think of his views, or however we may envy his faith in them, we envy still more his power and skill in setting them forth and defending them. The book is a strong one, and will make a fine reputation for its author.

Myelitis of the Anterior Horns, or Spinal Paralysis of the Adult and Child. By E. C. Seguin, M.D. New York: G. P. Putnam's Sons. 1877.

This is a most capital little book. It is not too much to say that it is a model of what a medical monograph ought to be. All that is valuable in the literature of the subject is referred to, a resume of all the important cases given, and several most thoroughly-observed examples of his own added by the author. No pretense of knowing more than is known, a just estimate of the labors of others, and a strict adherence to scientific methods mark the work throughout. The style is clear, precise, and elegant, fit vehicle for scientific thought. It is sincerely to be hoped that the accomplished author will give us other monographs on special nervous disorders; no one is better fitted for the task, and he will both benefit the profession and raise his own reputation by so doing.

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REPORTS OF SOCIETIES.

OPHTHALMOLOGICAL CONGRESS.

REPORT OF THE FIFTH INTERNATIONAL OPHTHALMOLOGICAL CONGRESS. Held in New York September, 1876. New York: D. Appleton & Co., pp. 265.

Although this Congress is styled International, only four out of twenty-seven papers published in the report are contributed by foreign delegates. It was a source of regret to all who attended the meeting that the delegation of members from abroad were so few, but the American representatives did every thing in their power to make the occasion, as it was, a great success. The volume before us was published by a committee composed of Drs. Hermann Knapp, Henry D. Noyes, Charles Bull, and Richard H. Derby. That their work has been well done is evinced by the result. It will not be possible in a brief review like this, to do more than to refer to a few of the more interesting papers. Dr. Noyes read the first paper, in which he described a method of operating for blepharoplasty, by taking the flaps from the nose and cheek. The incisions must be made so as to include in the pedicle of the flap all the vascular twigs which come from the orbit on the side where the deformity exists, as well, also, as some branches from the other side of the median line. The indications for this method are: 1. The repair of lesions about inner halves of the lid. 2. The supply of material where there is no skin available for flesh either upon the forehead or temple or outer part of cheek. Two cases in which the operation was made to meet the second indication, were shown to the Congress. The success obtained in both, which is also shown by diagrams in the publication, is very good.

A very interesting paper on Coloboma Lentis, is by Albert G. Heyl, of Philadelphia. He gives three cases of the kind, observed personally, and offers some very interesting remarks on the literature of the subject, in which he deals mainly with the process of development of the lens in the embryo. Dr. Alt, of New York, contributes a valuable paper on Sympathetic Neuro-retinitis. He collects four cases from literature, two by the late Prof. Von Graefe, and two by T. R. Pooley, of New York, and adds three new cases observed by Drs. H. Knapp and Greuning. The number of reported cases, he thinks, too small for statistical conclusions, but offers the following remarks connected with them as of interest. In six of the seven cases the neuro-retinitis was combined with irido-choroiditis. In one only it ran its course without any complication (*i. e.* the second case reported by Knapp). In five of the cases the patients entirely recovered, with the exception of one, whose final vision was 5-200. Two were totally lost. In four cases the enucleation of the first affected eye had been performed. The time between the affection of the eye first diseased and the appearance of sympathetic neuro-retinitis was, severally, forty years, thirty-five years, twenty years, and twelve years, two months and a half, and five weeks. Of the seven eyes which caused the sympathetic affection, four were lost by disease without any injury, whereas in the remaining three an injury was the primary cause of the trouble. Alt comments on the fact that sympathetic neuro-retinitis was more frequently induced by a non-traumatic cause than the other forms of sympathetic ophthalmia. According to statistics which he had recently made of one hundred cases, eighty resulted from an injury to the first eye. In the discussion following this paper, the President, Dr. E. Williams, of Cincinnati, said that in two cases in which he had examined the eyes, re-

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moved on account of the presence of a foreign body, he found in addition to inflammation of the ciliary region and vitreous, a most marked neuro-retinitis.

In these cases it was, of course, impossible to diagnose its condition before enucleation, but he was led to believe that, in most cases, or, at least, in many cases, of a foreign body in the eye, with severe resulting inflammation, and subsequent danger to the eye, there is an early neuro-retinitis. In reply to a question as to the mode of production of this form of sympathetic disease, Dr. Alt said that he had come to the conclusion that we have no right to say that the ciliary nerves are the sole cause of sympathetic trouble; that they *only* produce the sympathetic ophthalmia in the other eye; but that the optic nerve is in many instances also diseased, and by this disease, mechanically, sympathetic ophthalmia is produced in the other eye; and he deduces from the fact that, whereas, in four of those eyes which he examined he found disease of the optic nerve and retina, therefore the disease of the nerve in the other eye depended upon it This is going back to the old theory of the mode of transmission of sympathetic trouble. We agree with Noyes that this is, as yet, beyond our stand-point in pathological anatomy. Nor does it seem to us that the single observation advanced, in which there was neuro-retinitis without any other form of inflammation, can be so confidently pronounced upon as favoring such an assumption. With Noyes we agree that it will take vigorous demonstration to make us as confident of that chain of communication as we are now confident that the chain follows along the track of the ciliary nerve.

Dr. H. Knapp presented a paper on Orbital Tumors, in which he considered some of the more important types of these tumors, illustrating the subject by cases of which either the patient or specimens were shown. His remarks included—1. *Orbital Exostosis;* 2. *Retention Tumors of the Neighboring Cavities*; 3. *Sarcoma and Chondroma of the Orbital Wall;* and, 4. *Growths in the Neighboring Cavities of the Eye.* The remarks under each of these heads are eminently practical, and the illustrative cases most instructive. We commend this communication to the careful reading of the general surgeon, as well as to the specialist.

Dr. Mathewson, of Brooklyn, reports a case of choked disk, which is remarkable, for the length of time in which it remained without change in appearance or progressive impairment of vision. Prof. Nagel, of Tübingen, sent a communication on *The Introduction of the Meter-Measure for the Determination of the Lenses.* Mr. Carter thought the Congress already fully committed to the view taken by Dr. Nagel in this matter, in favor of introducing the metric system, by their action at the meeting in London in 1872, in which a declaration was signed pledging the members present to use the metric system. While on this subject, we may mention that both Drs. Loring and Knapp presented Ophthalmoscopes with metric system of notation of the lenses. Dr. Loring again discussed the question of *The Halo Round the Macula Lutea*, mainly for the purpose of reply to the objections to his theory advanced in 1871 by Dr. Brecht, and to assert his belief in the truth of the opinions advanced at that time, that the halo round the macula lutea, seen with the inverted image, is the product of reflection and refraction from the combination of curved surfaces which enter into the construction of this portion of the retina. Drs. Noyes and Agnew both contributed analyses of a large number of Asthenopes; the former of 1,079, the latter 1,060.

We have only done partial justice to the review of this handsome volume, which will compare very favorably with the publication of the Report of the Fourth Congress held in London in 1872. In conclusion, we would say that the success of the meeting was due in no small degree to the wisdom and tact displayed by the President, Dr. E. Williams, of Cincinnati, and to the efforts of the Committee on Arrangements.

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